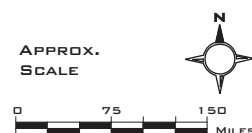




LEGEND:

- South Coast Air Basin
- State of California

SOURCE: California Air Resources Board, State and Local Air Monitoring Network Plan, May 2008



4.0 MONITORED AIR QUALITY

The SCAQMD monitors air quality conditions at 37 locations throughout the Basin. I-405 borders SCAQMD's Inland Orange County and Coastal Air Monitoring Subregions. The most relevant monitoring station to the project area is the Costa Mesa Monitoring Station (**Figure 4-1**). Alternative air monitoring stations are located in Anaheim, Long Beach, and Lake Forest. These stations are farther from the project area than the Costa Mesa Monitoring Station and were determined not to as accurately represent existing air quality conditions. Historical data from the Costa Mesa Monitoring Station was used to characterize the majority of existing conditions in the vicinity of the project area. The Costa Mesa Monitoring Station does not record PM concentrations. PM concentrations were obtained from the Anaheim Monitoring Station.

Table 3-2 shows pollutant levels, the State and federal standards, and the number of exceedances recorded at the Costa Mesa Monitoring Station compared to the highest figures derived from the General Forecast Area from 2007 to 2009. When compared to the General Forecast Area, the selected monitoring station recorded concentrations of PM_{2.5}, PM₁₀, O₃, and NO₂ that were lower than the Forecast Area. CO was higher than the General Forecast Area in 2007, and SO₂ was comparable between the Costa Mesa location and the General Forecast Area.

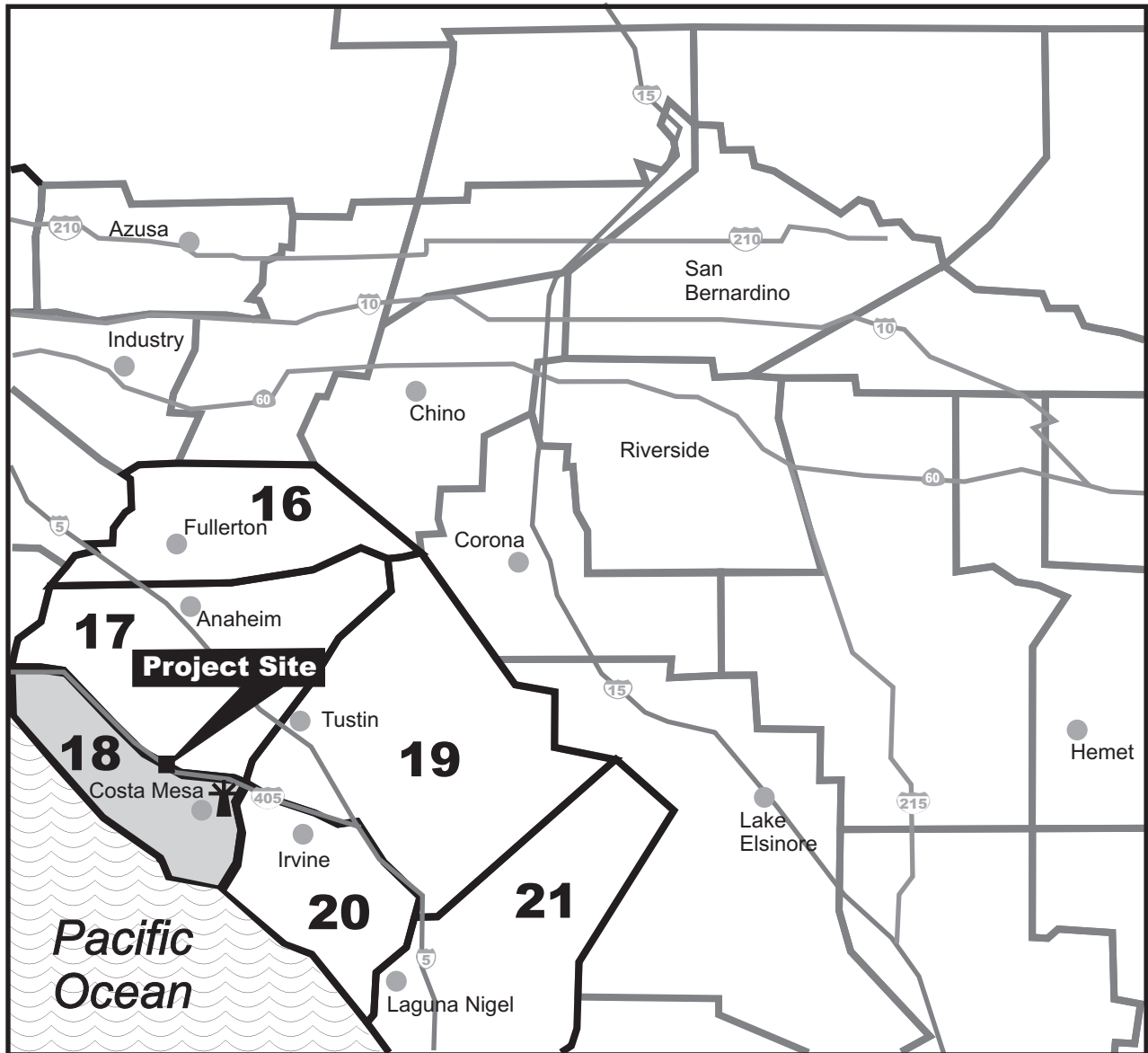
4.1 CARBON MONOXIDE

CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February.⁴

The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

As shown in **Table 4-1**, one-hour CO concentrations recorded at the Costa Mesa Monitoring Station ranged from 3 to 5 parts per million (ppm) and eight-hour CO concentrations ranged from 2.0 to 3.1 ppm. Monitored CO concentrations did not exceed the relevant standards from 2007 to 2009.

⁴Inversion is an atmospheric condition in which a layer of warm air traps cooler air near the surface of the earth, preventing the normal rising of surface air.



LEGEND: * Costa Mesa Monitoring Station

Air Monitoring Areas in Orange County:

- 16. North Orange County
- 17. Central Orange County
- 18. North Orange County Coastal
- 19. Saddleback Valley
- 20. Central Orange County Coastal
- 21. Capistrano Valley

SOURCE: South Coast Air Quality Management District Air Monitoring Areas, 1999.

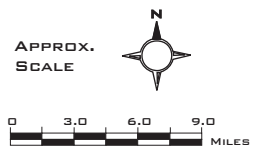


TABLE 4-1: 2007-2009 AMBIENT AIR QUALITY DATA IN PROJECT VICINITY

		North Coastal Orange County Subregion /a/			General Forecast Area /b/		
		Number of Days Above State Standard					
Pollutant	Pollutant Concentration & Standards	2007	2008	2009 /c/	2007	2008	2009
Carbon Monoxide	Maximum 1-hr concentration (ppm)	5	3	n/a	4	3	-
	Days > 20 ppm (State 1-hr standard)	0	0	n/a	0	0	
	Maximum 8-hr concentration (ppm)	3.1	2.0	2.2	2.7	2.2	-
	Days > 9.0 ppm (State 8-hr standard)	0	0	0	0	0	
Ozone	Maximum 1-hr Concentration (ppm)	0.08	0.09	0.09	0.12	0.11	-
	Days > 0.09 ppm (State 1-hr standard)	0	0	0	5	4	
	Days > 0.12 ppm (Federal 1-hr standard)	0	0	0	1	0	
Nitrogen Dioxide	Maximum 1-hr Concentration (ppm)	0.07	0.08	0.07	0.09	0.09	-
	Days > 0.18 ppm (State 1-hr standard)	0	0	0	0	0	
Sulfur Dioxide	Maximum 24-hr Concentration (ppm)	<0.01	0.01	<0.01	<0.01	<0.01	-
	Days > 0.04 ppm (State 24-hr standard)	0	0	0	0	0	
PM ₁₀	Maximum 24-hr concentration (µg/m ³)	74	42	62	75	52	-
	Days > 50 µg/m ³ (State 24-hr standard)	3	0	1	5	3	
PM _{2.5}	Annual Arithmetic Mean (µg/m ³)	11	10	12	13	12	-
	Exceed State Standard (12 µg/m ³)	No	No	No	Yes	Yes	

/a/ PM₁₀ and PM_{2.5} are not measured at North Coastal Orange County. Saddleback Valley data were used for PM₁₀ and PM_{2.5} measurements.
/b/ The General Forecast Area includes Central Orange County, North Coastal Orange County, and Saddleback Valley air monitoring areas of the SCAQMD.
/c/ 2009 data provided by CARB Air Quality Data Statistics. The Costa Mesa – Mesa Verde Drive Monitoring Station data was used for each pollutant, except PM_{2.5}, and PM₁₀ which used the Anaheim – Pampas Lane Monitoring Station.
SOURCE: SCAQMD, Historical Data by Year, available at <http://www.aqmd.gov/smog/historicaldata.htm>, accessed November 21, 2010.

4.2 OZONE

O₃ is a colorless gas that is formed in the atmosphere when ROG, which includes VOC, and NO_x react in the presence of ultraviolet sunlight. O₃ is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of ROG and NO_x, the components of O₃, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O₃ formation. Ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. The greatest source of smog-producing gases is the automobile. Short-term exposure (lasting for a few hours) to O₃ at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

As shown in **Table 4-1**, one-hour O₃ concentrations recorded at the Costa Mesa Monitoring Station ranged from 0.08 to 0.09 ppm. Monitored O₃ concentrations did not exceed the relevant standards from 2007 to 2009.

4.3 NITROGEN DIOXIDE

NO₂, like O₃, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO₂ are collectively referred to as NO_x and are major contributors to O₃ formation. NO₂ also contributes to the formation of PM₁₀. High concentrations of NO₂ can result in a brownish-red cast to the atmosphere with reduced visibility and can cause breathing difficulties. There is some indication

of a relationship between NO₂ and chronic pulmonary fibrosis. Some increase of bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 ppm.

As shown in **Table 4-1**, one-hour NO₂ concentrations recorded at the Costa Mesa Monitoring Station ranged from 0.07 to 0.08 ppm. Monitored NO₂ concentrations did not exceed the relevant standards from 2007 to 2009.

4.4 OXIDES OF SULFUR

SO₂ is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO₂ are coal and oil used in power plants and industries. Generally, the highest levels of SO₂ are found near large industrial complexes. In recent years, SO₂ concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO₂ and limits on the sulfur content of fuels. SO₂ is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO₂ can also yellow plant leaves and erode iron and steel.

As shown in **Table 4-1**, 24-hour SO₂ concentrations recorded at the Costa Mesa Monitoring Station were less than 0.01 ppm. Monitored SO₂ concentrations did not exceed the relevant standards from 2007 to 2009.

4.5 PARTICULATE MATTER

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Inhalable particulate matter, or PM₁₀, is about 1/7 the thickness of a human hair. Major sources of PM₁₀ include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. When inhaled, PM₁₀ particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM₁₀ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections.

As shown in **Table 4-1**, 24-hour PM₁₀ concentrations recorded at the Anaheim Monitoring Station ranged from 42 to 74 micrograms per cubic meter (µg/m³). Monitored PM₁₀ concentrations exceeded the State standard three times in 2007 and one time in 2009.

4.6 FINE PARTICULATE MATTER

Fine particulate matter, or PM_{2.5}, is roughly 1/28 the diameter of a human hair. PM_{2.5} results from fuel combustion (e.g. motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM_{2.5} can be formed in the atmosphere from gases such as SO₂, NO_x, and VOC. Very small particles of substances, such as lead, sulfates, and nitrates can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body. These substances can transport absorbed gases, such as chlorides or ammonium, into the lungs and cause injury. Whereas PM₁₀ tends to collect in the upper portion of the respiratory system, PM_{2.5} is so tiny that it can penetrate

deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

As shown in **Table 4-1** above, annual $PM_{2.5}$ concentrations recorded at the Anaheim Monitoring Station ranged from 10 to 12 $\mu g/m^3$. Monitored $PM_{2.5}$ concentrations did not exceed the State standard from 2007 to 2009.

4.7 VOLATILE ORGANIC COMPOUNDS

VOCs are carbon-containing compounds that evaporate into the air. VOCs contribute to the formation of smog and/or may be toxic. VOCs often have an odor, and examples include gasoline, alcohol, and the solvents used in paints. The SCAQMD does not directly monitor VOCs. However, VOCs combine with NO_x to generate O_3 , which, as discussed above, is monitored by the SCAQMD at the Costa Mesa Monitoring Station.

4.8 VISIBILITY

The federal Regional Haze Rule, established by the USEPA pursuant to Clean Air Act section 169A, establishes the national goal to prevent future and remedy existing impairment of visibility in federal Class I areas (such as federal wilderness areas and national parks). To meet federal Regional Haze Rule requirements, CARB adopted the California Regional Haze Plan on January 22, 2009, addressing California's visibility goals through 2018. In the Basin, Class I areas are typically restricted to higher elevations (greater than 6,000 feet above sea level) or far downwind of the metropolitan emission source areas. Visibility in these areas is typically unrestricted due to regional haze despite being in close proximity to the urban setting. The SCAQMD does not monitor assess visibility at any of the Orange County air quality monitoring stations.

4.9 TOTAL SUSPENDED PARTICULATE

Total Suspended Particulate (TSP) includes particles of solid or liquid matter (e.g., soot, dust, aerosols, fumes, and mist) up to approximately 30 microns in size. These particles are larger than PM_{10} and do not penetrate as deep into the lungs. USEPA replaced TSP as the indicator for both the annual and 24-hour primary (i.e., health-related) standards in 1987. The indicator includes only those particles with an aerodynamic diameter smaller than or equal to PM_{10} . The SCAQMD does not monitor TSP concentrations at any of the Orange County air quality monitoring stations.

4.10 LEAD

In the Basin, atmospheric lead is generated almost entirely by the combustion of leaded gasoline and contributes less than one percent of the material collected as TSP. Atmospheric lead concentrations have been reduced substantially in recent years due to the lowering of average lead content in gasoline. Once in the bloodstream, lead can cause damage to the brain, nervous system and other body systems. Children are highly susceptible to the effects of lead. The SCAQMD does not monitor lead concentrations at any of the Orange County air quality monitoring stations.

5.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

5.1 METHODOLOGY

Construction

The Sacramento Metropolitan Air Quality Management District Construction has developed RoadMod to quantify emissions associated with roadway construction. RoadMod is a data entry spreadsheet that utilizes various sources to estimate construction emissions, including OFFROAD2007 and EMFAC2007. Assumptions used for the construction calculations are as follows:

- Year 2015 start date
- 15-mile corridor length
- 250-foot corridor width
- 54-month construction period
- A maximum of 4.5 acres of land disturbed per day
- A maximum of 622 cubic yards per day of soil to be imported
- A maximum of 604 cubic yards per day of soil to be exported

Operations

EMFAC2007 was used to calculate operational emissions. EMFAC2007 is the latest emission inventory model for motor vehicles operating on roads in California. This model reflects CARB current understanding of how vehicles travel and how much they pollute. The EMFAC2007 model can be used to show how California motor vehicle emissions have changed over time and are projected to change in the future. The emission rates provided by EMFAC2007 in grams per mile were used in conjunction with traffic volumes and speeds to calculate daily emissions for existing conditions. The vehicle miles traveled for each alternative are presented in **Table 5-1**. The traffic volumes and speeds were split into northbound and southbound lanes for three I-405 segments: SR-73 to Brookhurst Street, Brookhurst Street to SR-22 East, and SR-22 East to I-605. The data were also split based on GP and HOV lanes. This process was repeated for both opening year 2020 and horizon year 2040. All of these variables were considered in the estimation of regional air pollutant emissions.

TABLE 5-1: VEHICLE MILES TRAVELED	
Scenario	Automobile VMT
2009 Existing Conditions	4,063,000
2020 No Build	4,396,000
2020 Alternative 1	4,714,000
2020 Alternative 2	4,936,000
2020 Alternative 3	5,001,000
2040 No Build	4,618,000
2040 Alternative 1	5,143,000
2040 Alternative 2	5,512,000
2040 Alternative 3	5,631,000
SOURCE: Albert Grover & Associates, 2011.	

Greenhouse Gas Emissions

GHG emissions were quantified for construction and operational activity. Similar to regional construction emissions, construction GHG emissions were estimated using RoadMod and associated OFFROAD2007 and EMFAC2007 emission factors. Similar to regional operational emissions, operational GHG emissions were estimated using EMFAC2007, vehicle miles traveled, and traffic speeds.

5.2 SIGNIFICANCE CRITERIA

According to the Council on Environmental Quality regulations (40 CFR §§ 1500-1508), the determination of a significant impact is a function of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Both short- and long-term effects are relevant. Intensity refers to the severity of impact. To determine significance, the severity of the impact must be examined in terms of the type, quality and sensitivity of the resource involved; the location of the proposed project; the duration of the effect (short- or long-term) and other consideration of context. Adverse impacts will vary with the setting of the proposed action and the surrounding area.

6.0 POTENTIAL AIR QUALITY IMPACTS

This section examines the degree to which the project alternatives may cause significant adverse changes to air quality. Both short-term construction emissions occurring from activities, such as grading and haul truck trips, and long-term effects related to the ongoing operation of the alternatives are discussed in this section. This analysis focuses on air pollution from two perspectives: daily emissions and pollutant concentrations. “Emissions” refer to the quantity of pollutants released into the air, measured in pounds per day (ppd). “Concentrations” refer to the amount of pollutant material per volumetric unit of air, measured in parts per million (ppm) or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

6.1 SHORT-TERM IMPACTS

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities related to construction. Emissions from construction equipment also are anticipated and would include CO, NO_x, VOCs, directly-emitted particulate matter (PM₁₀ and PM_{2.5}), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO_x and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM₁₀, PM_{2.5}, and small amounts of CO, SO₂, NO_x, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM₁₀ emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM₁₀ emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the USEPA to add 1.09 tonne (1.2 tons) of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent.⁵ Caltrans' Standard Specifications (Section 10) pertaining to dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

In addition to dust-related PM₁₀ emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO₂, NO_x, VOCs and some soot particulate (PM₁₀ and PM_{2.5}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those

⁵SCAQMD indicates that Rule 403 can reduce fugitive dust emissions up to 61%.

vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

SO₂ is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 ppm of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and CARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO₂-related issues due to diesel exhaust will be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving sites. Such odors would be quickly dispersed below detectable thresholds as distance from the site increases.

For informational purposes, **Table 6-1** shows the estimated daily emissions associated with each construction phase. The emissions were estimated using RoadMod and the assumptions listed in the methodology discussion. Limited detailed construction information was available at the time of this analysis. Therefore, the analysis mostly relies on RoadMod default assumptions, including the fleet mix. The override option was used to eliminate signal boards from the fleet mix because signal boards are typically solar powered and do not generate air emissions. The construction schedule indicates that overlapping activities would occur throughout the project corridor. Without detailed information available, this conservative analysis assumed that each of the construction phases presented in **Table 6-1** could occur simultaneously throughout the corridor. Construction emissions would be temporary, and not result in any long-term impacts. Therefore, Alternative 1 would not result in an adverse impact related to construction emissions.

TABLE 6-1: ESTIMATED DAILY CONSTRUCTION EMISSIONS						
Construction Phase	Pounds Per Day					
	VOC	NO_x	CO	SO_x	PM_{2.5} /a/	PM₁₀ /a/
Grubbing/Land Clearing	3	25	20	<1	10	46
Grading/Excavation	8	54	73	<1	11	47
Drainage/Utilities	3	17	17	<1	10	46
Paving	2	10	14	<1	<1	<1
Potential Overlapping Emissions	16	106	124	<1	31	139
/a/ RoadMod assumes a 50 percent fugitive dust control efficiency rate. To convert this to the SCAQMD 61 percent rate, fugitive dust emissions were doubled, and then reduced by 61 percent to account for Rule 403. SOURCE: TAHA, 2011.						

Caltrans is the Lead Agency for the proposed project and has full discretion to establish the criteria for determining significance under CEQA. Caltrans acknowledges that the SCAQMD has established regional and localized construction significance thresholds for the South Coast Air Basin. However, Caltrans has established a different methodology than the SCAQMD for assessing construction impacts. The proposed project will comply with all SCAQMD rules and regulations regarding construction emissions (e.g., Rule 403 for the control of fugitive dust). As previously discussed, the proposed project would also comply with Caltrans Standard Specifications for Construction (Section 10 and 18 [Dust Control] and Section 39-3.06 [Asphalt Concrete Plants]) and short-term emissions would result in a less-than-significant impact.

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would include construction of an additional travel lane in each direction when compared to Alternative 1. This would result in a longer construction period and more total emissions when compared to Alternative 1. However, Alternative 2 daily construction intensity (e.g., equipment hours) would likely be similar to that assumed for Alternative 1. **Table 6-1** represents daily emissions associated with Alternative 2. Construction emissions would be temporary, and not result in any long-term impacts. Therefore, Alternative 2 would not result in an adverse impact related to construction emissions.

Alternative 3 – Express Facility

Similar to Alternative 2, Alternative 3 would include construction of two travel lanes in each direction. This could result in a longer construction period and more total emissions when compared to Alternative 1 but similar emissions as Alternative 2. **Table 6-1** represents daily emissions associated with Alternative 3. Construction emissions would be temporary, and not result in any long-term impacts. Therefore, Alternative 3 would not result in an adverse impact related to construction emissions.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to construction emissions.

6.2 REGIONAL ANALYSIS

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

Alternative 1 is fully funded and is in the 2008 Regional Transportation Plan which was found to conform by the Southern California Association of Governments on May 8, 2008, and FHWA and FTA adopted the air quality conformity finding on June 5, 2008. The project is described as, “construct one additional all purpose lane in each direction on I-405 and provide additional capital improvements from SR 73 through the LA County Line” (RTP and RTIP ID ORA030605). The project is also included in the Southern California Association of Governments financially constrained 2008 Regional Transportation Improvement Program. The Southern California Association of Governments Regional Transportation Improvement Program was found to conform by FHWA and FTA on July 17, 2008. The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2008 RTIP and the assumptions in the Southern California Association of Governments emissions analysis.

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways: it fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed, and it provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQMP (adopted 2007). Because the AQMP is based on projections from local General Plans, projects that are consistent with the local General Plan are generally considered consistent with the AQMP. Implementation of the proposed project would also not delay timely implementation

of the Transportation Control Measures identified in the AQMP. The proposed project would not significantly contribute to or cause deterioration of existing air quality; therefore, mitigation measures are not required for the long-term operation of the proposed project.

A regional emissions analysis was also completed based on vehicle miles traveled and vehicle speeds. Regional criteria pollutant and VOC emissions are presented in **Tables 6-2 through 6-4**. Alternative 1 future emissions (2020 and 2040) would be less than baseline emissions. This decrease is due to higher vehicle speeds under Alternative 1, which generally result in lower emission rates. Therefore, Alternative 1 would result in a beneficial effect related to regional operational emissions.

TABLE 6-2: ESTIMATED 2009 DAILY OPERATIONAL EMISSIONS

Emission Source	Pounds per Day					
	VOC	NO _x	CO	SO _x	PM _{2.5}	PM ₁₀
No Build	1,030	6,290	25,119	42	258	426

SOURCE: TAHA, 2011.

TABLE 6-3: ESTIMATED 2020 DAILY OPERATIONAL EMISSIONS

Emission Source	Pounds per Day					
	VOC	NO _x	CO	SO _x	PM _{2.5}	PM ₁₀
No Build	845	3,836	18,011	69	612	669
Alternative 1	620	3,537	15,297	58	508	559
Net Change from No Build to Alternative 1	(225)	(299)	(2,714)	(11)	(104)	(110)
Alternative 2	633	3,651	14,784	57	504	554
Net Change from No Build to Alternative 2	(212)	(185)	(3,227)	(12)	(108)	(115)
Alternative 3	634	3,670	14,824	58	504	553
Net Change from No Build to Alternative 3	(211)	(166)	(3,187)	(11)	(108)	(116)

SOURCE: TAHA, 2011.

TABLE 6-4: ESTIMATED 2040 DAILY OPERATIONAL EMISSIONS

Emission Source	Pounds per Day					
	VOC	NO _x	CO	SO _x	PM _{2.5}	PM ₁₀
No Build	859	2,736	12,998	108	749	1,049
Alternative 1	513	2,285	11,143	82	508	790
Net Change from No Build to Alternative 1	(346)	(451)	(1,855)	(26)	(241)	(259)
Alternative 2	397	2,074	9,795	69	402	677
Net Change from No Build to Alternative 2	(462)	(662)	(3,203)	(39)	(347)	(372)
Alternative 3	401	2,123	9,831	70	408	682
Net Change from No Build to Alternative 3	(458)	(613)	(3,167)	(38)	(341)	(367)

SOURCE: TAHA, 2011.

Alternative 2 – Add Two GP Lanes in Each Direction

The design concept of Alternative 2 includes an additional general purpose lane beyond the Alternative 1 design concept that was included in the 2008 RTP. **Tables 6-3** and **6-4** show that Alternative 2 future emissions (2020 and 2040) would be less than baseline emissions, and would be similar to Alternative 1 emissions (no greater than three percent). This decrease is due to higher vehicle speeds under Alternative 2, which generally result in lower emission rates. Alternative 2 would be consistent with the assumptions in the Southern California Association of Governments regional emissions analysis, and would result in a beneficial effect related to regional operational emissions.

Alternative 3 – Express Facility

The design concept of Alternative 3 includes an additional general purpose lane and express facility beyond the Alternative 1 design concept that was included in the 2008 RTP. **Tables 6-3** and **6-4** show that Alternative 3 future emissions (2020 and 2040) would be less than baseline emissions, and would be similar to Alternative 1 emissions (no greater than four percent). This decrease is due to higher vehicle speeds under Alternative 3, which generally result in lower emission rates. Alternative 3 would be consistent with the assumptions in the Southern California Association of Governments regional emissions analysis, and would result in a beneficial effect related to regional operational emissions.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to project consistency with regional plans.

6.3 CO PROTOCOL

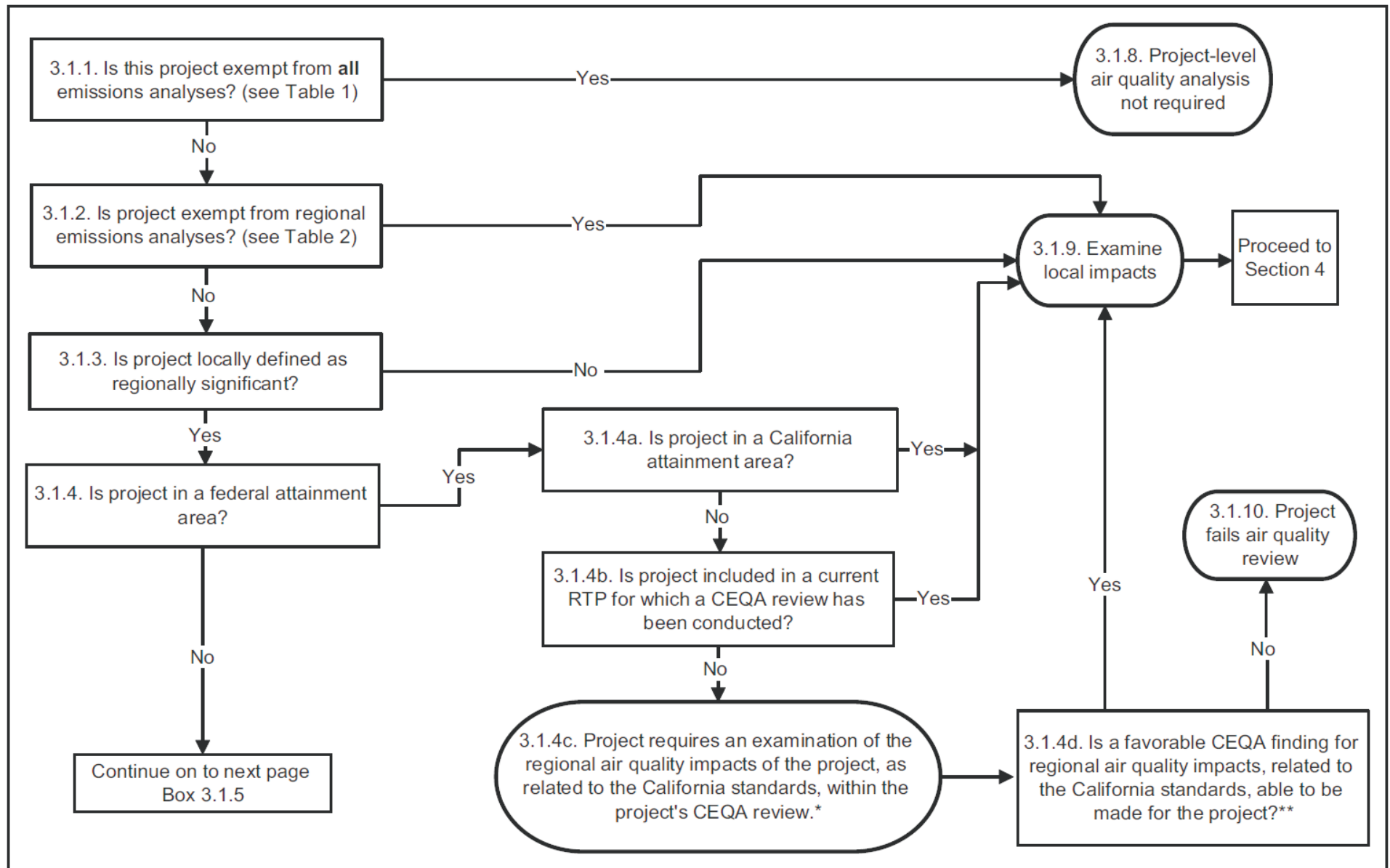
In California, the procedures of the local analysis for CO are modified pursuant to 40 CFR 93.123(a)(1) of the Transportation Conformity Rule. Sub-paragraph (a)(1) states the following:

CO hot-spot analysis. (1) The demonstrations required by 40 CFR 93.116 (“Localized CO and PM₁₀ violations”) must be based on a quantitative analysis using the applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W (Guideline on Air Quality Models). These procedures shall be used in the following cases, unless different procedures developed through the interagency consultation process required in 40 CFR 93.105 and approved by the EPA Regional Administrator are used:

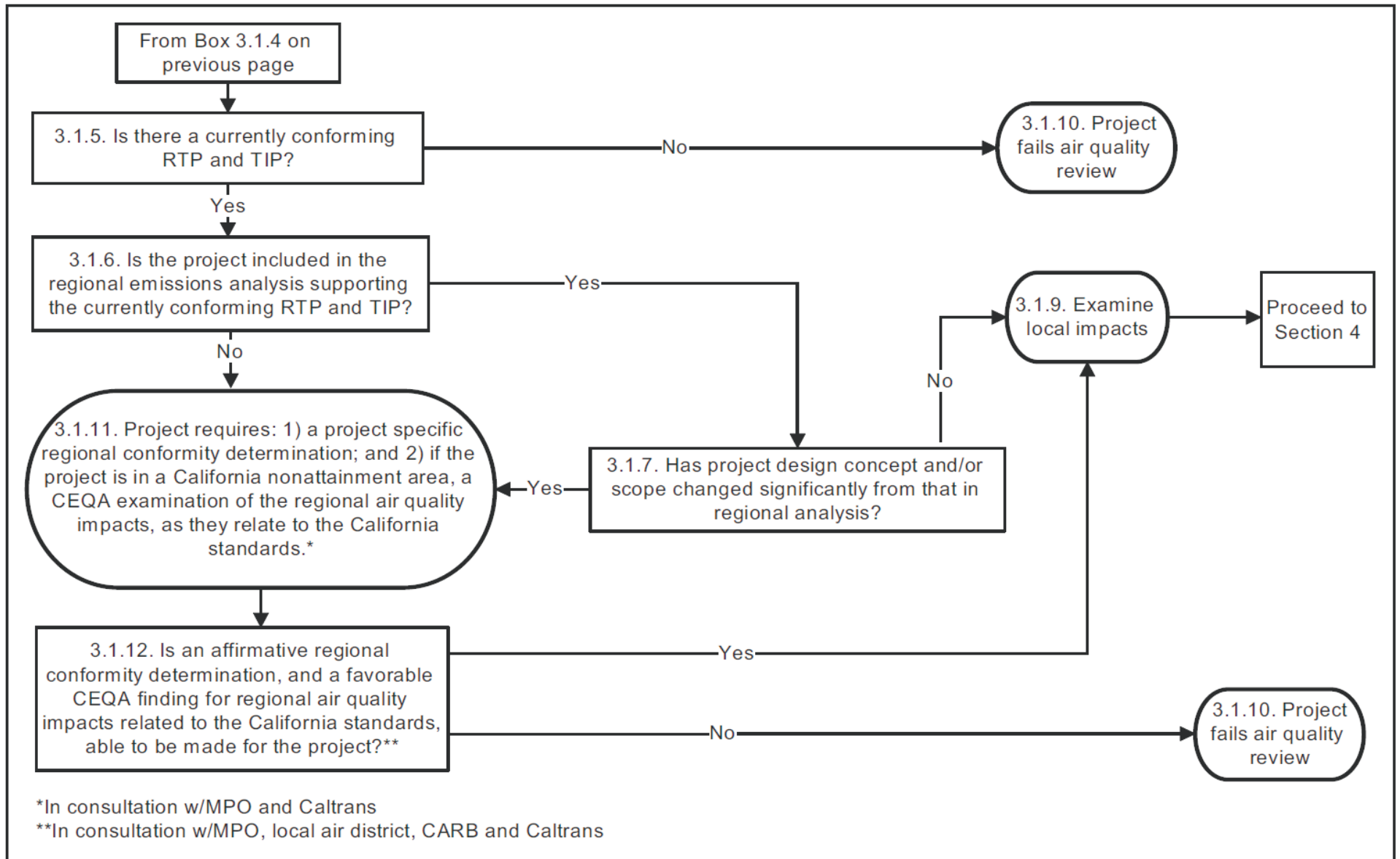
The sub-paragraph allows for an alternative identified in the *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) developed by the Institute of Transportation Studies at the University of California, Davis (UC Davis). The CO Protocol outlines the procedure for performing a CO analysis, which was approved by David P. Howekamp, Director of the Air Division of the USEPA Region IX, in October 1997. The USEPA deemed the CO Protocol as an acceptable option to the mandated quantitative analysis. The CO Protocol incorporates 40 CFR 93.115 through 93.117, and 40 CFR 93.126 through 93.128 into its rules and procedures.

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

The scope required for CO local analysis is summarized in the CO Protocol, Section 3 (Determination of Project Requirements); refer to **Figures 6-1** and **6-2**. In Section 3, the CO Protocol provides two requirement decision flowcharts that are designed to assist the project sponsor(s) in evaluating the requirements that apply to specific projects. The flowchart in Figure 1 of the CO Protocol applies to new projects and was used in this local analysis.



SOURCE: CALTRANS, 2010.



SOURCE: CALTRANS, 2010.

Below is a step-by-step explanation of the flow chart. Each level cited is followed by a response, which would determine the next applicable level of the flowchart for the project. The flowchart begins with Section 3.1.1:

3.1.1. Is this project exempt from all emissions analyses? **No.** Table 1 of the CO Protocol is Table 2 of §93.126. The proposed project does not appear in Table 1. It is not exempt from all emissions analyses.

3.1.2. Is this project exempt from regional emissions analyses? **No.** Table 2 of the CO Protocol lists projects that are exempt from regional emissions analysis. The table does not include additional general purpose or express freeway lanes. It is not exempt from regional emissions analyses.

3.1.3. Is the project locally defined as regionally significant? **Yes.** The proposed project is considered regionally significant, as it is included in the 2008 Regional Transportation Plan.

3.1.4. Is the project in a federal attainment area? **No.** The proposed project is within the South Coast Air Basin, which has been designated as an attainment/maintenance area for the federal CO standards effective June 11, 2007.

3.1.5. Is there a currently conforming RTP and Transportation Improvement Plan (TIP)? **Yes.** The proposed project is located in the SCAG region which has a currently conforming RTP and TIP. FHWA determined the RTP to conform to the SIP on June 5, 2008. FHWA determined the TIP to conform to the SIP on November 17, 2008.

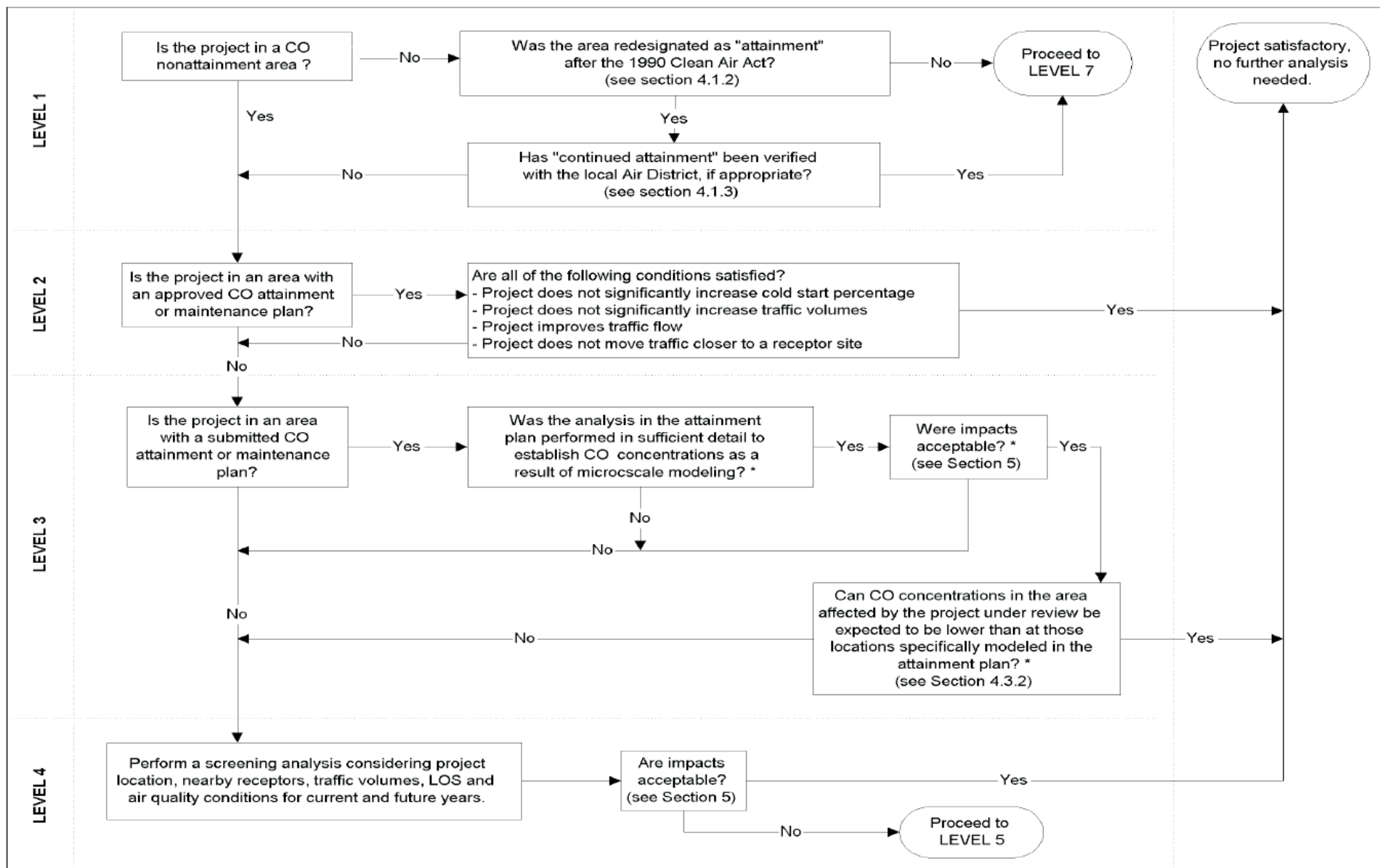
3.1.6. Is the project included in the regional emissions analysis supporting the currently conforming RTP and TIP? **Yes.** The proposed project is included in the regional emissions analysis conducted by SCAG for the conforming 2008 RTP. Therefore, the individual projects contained in the plan are conforming projects, and will have air quality impacts consistent with those identified in the SIP.

3.1.7. Has the project design concept and/or scope changed significantly from that in the regional analysis? **No.** The project design concept refers to the type of facility identified by the proposed project. The project design scope refers to the design aspects that affect the proposed facility's impact on emissions, usually as they related to carrying capacity and control. The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2008 TIP and the assumptions in the Southern California Association of Governments regional emissions analysis.

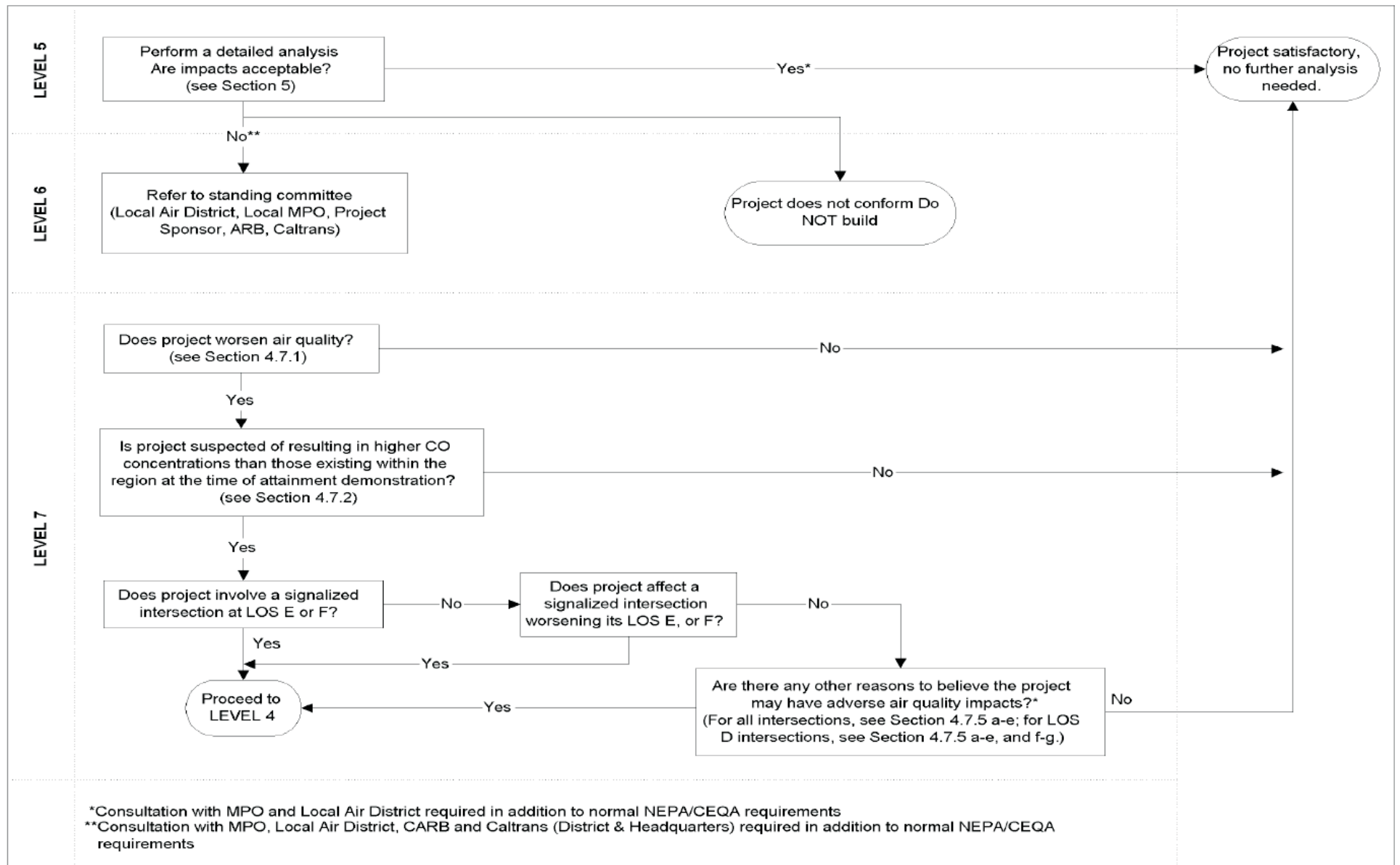
3.1.9. Examine local impacts. Section 3.1.9 of the flowchart directs the project evaluation to Section 4 (Local Analysis) of the CO Protocol. This concludes Figure 1.

Section 4 contains a flowchart (**Figures 6-3 and 6-4**) to determine the type of CO analysis required for the proposed project. The flowchart begins at Level 1:

Level 1a. Is the project in a CO non-attainment area? **No.** As stated in 3.1.4, the proposed project is within the South Coast Air Basin, which has been designated as an attainment/maintenance area for the federal CO standards effective June 11, 2007.



SOURCE: CALTRANS, 2010.



SOURCE: CALTRANS, 2010.

Level 1b. Yes. Was the area redesignated as “attainment” after the 1990 Clean Air Act? The proposed project is located in the South Coast Air Basin, under the jurisdiction of the SCAQMD, and was classified nonattainment after the 1990 FCAA. The South Coast Air Basin has been granted federal redesignation to attainment/maintenance effective June 11, 2007.

Level 1c. Has “continued attainment” been verified with local Air District, if appropriate? **Yes.** As stated above, the South Coast Air Basin has been recently redesignated as an attainment/maintenance area for the federal CO standards effective June 11, 2007. Additionally, **Table 4-1** shows that the Costa Mesa Monitoring Station has not recorded an exceedance for CO in the past three years.

Level 7a. Does the project worsen air quality? **Yes.** Although the Basin is designated as an attainment/maintenance area for CO, it is necessary to determine project contributions to local air quality. Intersections where air quality may be getting worse are of primary concern. Section 4.7.1 of the CO Protocol provides criteria to determine whether a project is likely to worsen air quality. These criteria include increases in vehicles operating in cold start mode, increases in traffic volumes greater than five percent, and a worsening of traffic flow. Alternative 1 would increase traffic volumes by more than five percent.

Level 7b. Is the project suspected of resulting in higher CO concentrations than those existing within the region at the time of attainment demonstration? **Yes.** Intersection reconfigurations may move the roadway closer to receptors and may increase peak hour traffic volumes. This may result in higher CO concentrations near reconfigured intersections.

Level 7c. Does the project involve a signalized intersection at LOS E or F? **Yes.** As shown in Air Quality Appendix H, numerous intersections will operate at LOS E or F. The CO Protocol requires a screening analysis based on Level 4 of **Figure 6-3**.

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would include the same intersection improvements as Alternative 1. A CO screening analysis is required.

Alternative 3 – Express Facility

Alternative 3 would include the same intersection improvements as Alternative 1. A CO screening analysis is required.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to CO concentrations.

6.4 CO SCREENING ANALYSIS

The Caltrans CO screening analysis is described in Appendix A of the CO Protocol. Caltrans has issued guidance stating not to use Appendix A of the CO Protocol. Appendix A was developed using EMFAC7F which is now obsolete. The screening analysis should be replaced with the detailed analysis described in Appendix B of the CO Protocol.

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

A CO hot spot analysis was completed in based on the methodology provided in the Caltrans *Transportation Project-Level Carbon Monoxide Protocol*. The USEPA CAL3QHC micro-scale dispersion model was used to calculate CO concentrations. The traffic volumes and associated concentrations are identical for each build alternative. A worst-case representative sample of intersections was chosen based on low LOS and high traffic volumes. CO concentrations at the analyzed intersections are shown in **Tables 6-5** and **6-6**. One-hour CO concentrations under project conditions would be approximately 4 ppm at worst-case sidewalk receptors in the year 2020, and 3 ppm in 2040. Eight-hour CO concentrations under project conditions would be approximately 3.7 ppm at worst-case sidewalk receptors in the year 2020, and 2.3 ppm in 2040. The State one- and eight-hour standards of 20 and 9.0 ppm, respectively, would not be exceeded at the analyzed intersections. Therefore, Alternative 1 would not result in a CO hot spot.

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would include the same intersection improvements as Alternative 1. Intersections would experience similar volumes as used in the Alternative 1 analysis presented in **Tables 6-5** and **6-6**. The CO concentrations were well below the State one- and eight-hour CO standards and would remain so under Alternative 2. Therefore, Alternative 2 would not result in a CO hot spot.

TABLE 6-5: ESTIMATED CARBON MONOXIDE CONCENTRATIONS - 2020		
Interchange and Intersection	1-hour (parts per million)	8-hour (parts per million)
BRISTOL STREET INTERCHANGE		
Bristol Street and I-405 NB Off-Ramp/South Coast Plaza	4	3.7
EUCLID STREET AND ELLIS AVENUE INTERCHANGE		
Euclid Street and I-405 NB Ramps/Newhope Street	4	3.6
I-405 SB Ramps and Ellis Avenue	4	3.5
MAGNOLIA STREET AND WARNER AVENUE INTERCHANGE		
Magnolia and Warner Avenue	4	3.6
BEACH BOULEVARD AND EDINGER AVENUE INTERCHANGE		
Beach Boulevard and McFadden Avenue	4	3.7
Beach Boulevard and I-405 SB Ramps	4	3.7
GOLDENWEST STREET AND BOLSA AVENUE INTERCHANGE		
Goldenwest St and Bolsa Avenue	4	3.7
SPRINGDALE STREET AND WESTMINSTER BOULEVARD INTERCHANGE		
Springdale Street and Westminster Boulevard	4	3.6
GOLDENWEST STREET AND BOLSA AVENUE INTERCHANGE		
I-405 NB Off-Ramps/SR-22 EB Ramps and Garden Grove Boulevard	4	3.6
SEAL BEACH BOULEVARD INTERCHANGE		
Seal Beach Boulevard and I-405 SB Ramps	4	3.7
State Standard	20	9.0
SOURCE: TAHA, 2011.		

Alternative 3 – Express Facility

Alternative 3 would include the same intersection improvements as Alternative 1. Intersections would experience similar volumes as used in the Alternative 1 analysis presented in **Tables 6-5** and **6-6**. The CO concentrations were well below the State one- and eight-hour CO standards and would remain so under Alternative 3. Therefore, Alternative 3 would not result in a CO hot spot.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to CO concentrations.

TABLE 6-6: ESTIMATED CARBON MONOXIDE CONCENTRATIONS - 2040		
Interchange and Intersection	1-hour (parts per million)	8-hour (parts per million)
BRISTOL STREET INTERCHANGE		
Bristol Street and I-405 NB Off-Ramp/South Coast Plaza	3	2.3
EUCLID STREET AND ELLIS AVENUE INTERCHANGE		
Euclid Street and I-405 NB Ramps/Newhope Street	2	2.2
I-405 SB Ramps and Ellis Avenue	2	2.2
MAGNOLIA STREET AND WARNER AVENUE INTERCHANGE		
Magnolia and Warner Avenue	2	2.2
BEACH BOULEVARD AND EDINGER AVENUE INTERCHANGE		
Beach Boulevard and McFadden Avenue	3	2.3
Beach Boulevard and I-405 SB Ramps	3	2.3
GOLDENWEST STREET AND BOLSA AVENUE INTERCHANGE		
Goldenwest St and Bolsa Avenue	2	2.2
SPRINGDALE STREET AND WESTMINSTER BOULEVARD INTERCHANGE		
Springdale Street and Westminster Boulevard	2	2.2
GOLDENWEST STREET AND BOLSA AVENUE INTERCHANGE		
I-405 NB Off-Ramps/SR-22 EB Ramps and Garden Grove Boulevard	2	2.2
SEAL BEACH BOULEVARD INTERCHANGE		
Seal Beach Boulevard and I-405 SB Ramps	3	2.3
State Standard	20	9.0
SOURCE: TAHA, 2011.		

6.5 PM₁₀ QUALITATIVE ANALYSIS

Build Alternatives

Nonattainment/maintenance areas are subject to the Transportation Conformity Rule, which requires local transportation and air quality officials to coordinate planning to ensure that transportation projects, such as road construction, do not affect an area's ability to reach its clean air goals. Transportation conformity requirements become effective one year after an area is designated as nonattainment.

A qualitative hot spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations resulting from a new transportation project and a comparison of those concentrations to the relevant air quality standard. A hot spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets FCAA conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts.

The USEPA published a final rule on March 10, 2006 (effective as of April 5, 2006) and established conformity criteria and procedures for transportation projects to determine their impacts on ambient PM₁₀ levels in nonattainment and maintenance areas. The March 10, 2006 final rule requires a qualitative PM₁₀ hot spot analysis to be completed for a project of air quality concern (POAQC). The proposed project is within a nonattainment area for federal PM_{2.5} and PM₁₀ standards. Therefore, per 40 CFR Part 93, analyses are required for conformity purposes. However, the USEPA does not require hot spot analyses (either qualitative or quantitative) for those that are not listed in Section 93.123(b)(1) as a project of air quality concern.

The project is a project of concern for PM₁₀ and/or PM_{2.5} hot spot analysis based on 40 CFR 93.116 and 93.123, and USEPA's Hot Spot Guidance. Interagency Consultation concurred with this determination on January 25, 2011. Pursuant to Federal Conformity Regulations (specifically, 40 CFR 93.105 [c] [1][i]), a qualitative analysis of the localized PM emissions was conducted following the methodology provided in the USEPA Guidelines. The qualitative analysis is presented in this section.

a) Standards and Conformity Conditions

PM₁₀ nonattainment and maintenance areas are required to attain and maintain one standard:

- 24-hour standard - 150 µg/m³: The 24-hour PM₁₀ standard is attained when the average number of exceedances in the previous three calendar years is less than or equal to one. An exceedance occurs when a 24-hour concentration of greater than the standard 150 µg/m³ is measured at a monitoring site near the project site.

PM_{2.5} nonattainment and maintenance areas are required to attain and maintain two standards. The standards are described below.

- 24-hour standard - 35 µg/m³: USEPA strengthened the PM_{2.5} standard from was 65 µg/m³ to 35 µg/m³ on December 17, 2006. A State Implementation Plan (SIP) revision will be due to USEPA by April 2013 demonstrating an attainment date of April 2015 with a possible extension to April 2020. The PM_{2.5} conformity for the proposed project is based on trend analysis that is applicable to the current standard.
- Annual standard - 15.0 µg/m³: The 24-hour PM_{2.5} standard is based on a three-year average of the 98th percentile of 24-hour recorded concentrations; the annual standard is based on a three-year average of the annual arithmetic mean PM_{2.5} recorded at the monitoring station. A PM_{2.5} hot spot analysis must consider both standards unless it is determined for a given area that meeting the controlling standard would ensure that CAA requirements are met for both standards.

b) Project Compliance with CFR 93.116 and 93.123

A project may be considered to have one of three types of status: (1) Exempt; (2) Not be exempt but not be a POAQC based on the specific parameters established in the regulations; and (3) It may be a POAQC, which requires that a qualitative hot spot analysis be conducted. The I-405 Improvement Project does not meet the definition of an exempt project under Section 93.126 or 93.128.

The 2006 Final Transportation Conformity Rule defines a POAQC that requires PM₁₀ and PM_{2.5} hot spot analysis in 40 CFR 93.123(b)(1) as:

- i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- ii) Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- v) Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{2.5} and PM₁₀ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project falls within the category of new or expanded highway projects with a significant number of diesel vehicles, and it would be affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles. The proposed project is a POAQC based on the criteria listed in the final conformity rule (40 CFR 93.123 (b)(1)); therefore, a qualitative project-level hot spot assessment was conducted to assess whether the project would cause or contribute to any new localized PM₁₀ or PM_{2.5} violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM₁₀ or PM_{2.5} NAAQS.

c) Analysis Methodology and Types of Emissions Considered

The qualitative PM hot spot analysis was performed following the USEPA document *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas*. The analysis was based on directly emitted PM_{2.5} emissions, including tailpipe, brake wear, and tire wear. Secondary particles formed through PM_{2.5} precursors take several hours to form in the atmosphere and would be dispersed beyond the immediate project vicinity; therefore, they are not considered in a hot spot analysis. Secondary emissions are included in the regional emission analysis prepared for the conforming Regional Transportation Plan and Transportation Improvement Plan. Vehicles cause dust from paved and unpaved roads to be re-entrained or re-suspended in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for hot spot analysis if USEPA or the state air agency has made a finding that such emissions are a significant contributor to the PM air quality problem (40 CFR 93.102(b)(3)). The particulate emissions include PM emissions from vehicle exhaust, brake wear, tire wear, and re-entrained road dust. The emission

inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are a significant contributor to directly emitted PM_{10} and $PM_{2.5}$. Because the 2007 AQMP is incorporated as part of the California 2007 SIP, PM from re-entrained roads was included in the hot spot analysis. Re-entrained road dust was estimated based on VMT and Chapter 13.2.1 of AP-42, Fifth Edition, USEPA Compilation of Air Pollutant Emission Factors.

The project covers a distance of approximately 15 miles and construction activity would not occur in one place for more than five years. Temporary construction emissions are not considered in this analysis.

For performing the trend analysis, PM_{10} and $PM_{2.5}$ ambient air quality data from monitoring stations within the proposed project area were utilized. This data were compared with PM_{10} and $PM_{2.5}$ NAAQS and also examined for trends to predict future conditions in the project vicinity. In the following sections, the project impacts, as well as the likelihood of these impacts interfering with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots, are discussed. The opening year (2020), as well as the horizon year of 2040, were considered for the analysis.

d) Data Consideration

The Costa Mesa Monitoring Station best represents air quality conditions in the project area. It is the nearest monitoring station to the I-405 project area. However, this station does not monitor PM_{10} and $PM_{2.5}$. Based on SCAQMD General Forecast Areas, the Mission Viejo and Anaheim Monitoring Stations also represent the project area. The Mission Viejo Monitoring Station was chosen for this analysis because it is a coastal monitoring station located approximately 3.5 miles south east of the I-405. It was determined that the inland Anaheim Monitoring Station meteorological conditions do not accurately represent the project area.

Recent data available from the Mission Viejo Monitoring Station include the years 2000 to 2009. **Table 6-7** and **Figure 6-5** show the particulate concentrations and their historical trend (both PM_{10} and $PM_{2.5}$), as recorded at this monitoring station. **Table 6-7** provides the measured concentrations and the number of days that the applicable NAAQS was exceeded. **Figure 6-5** includes normalized concentrations and shows the trend of the pollutant changes in the area. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the applicable national standard; therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the ambient air quality standard. The monitored data show the following trends:

- Respirable Particulate Matter (PM_{10}) – During the recorded period of 2000 to 2009, the 24-hour maximum monitored data was well below the NAAQS. The highest recorded 24-hour concentration during the period of 2000 to 2009 was $98 \mu\text{g}/\text{m}^3$, which was recorded in 2000. The NAAQS were not exceeded at any time during the last ten years at the monitoring station.
- Fine Particulate Matter ($PM_{2.5}$) – During the recorded period of 2000 to 2009, the 24-hour 98th percentile concentration, which was averaged over three years, exceeded the standard multiple years. In addition, the maximum 24-hour concentration exceeded the standard multiple years. However, the data shows a declining trend in both 24-hour and annual concentrations.

TABLE 6-7: PARTICULATE MATTER DATA SUMMARY

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Recorded Concentrations ($\mu\text{g}/\text{m}^3$)									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Respirable Particulate Matter (PM_{10})	Maximum 24-hr concentration Days > NAAQS ($150 \mu\text{g}/\text{m}^3$)	98 0	60 0	80 0	64 0	47 0	41 0	57 0	74 0	42 0	56 0
Fine Particulate Matter ($\text{PM}_{2.5}$)	Maximum 24-hr concentration Days > NAAQS ($35 \mu\text{g}/\text{m}^3$)	95 16	53 19	59 13	51 *	49 10	35 0	47 *	49 *	33 0	39 4
	Maximum Annual concentration Exceed NAAQS ($15.0 \mu\text{g}/\text{m}^3$)?	15 Yes	16 Yes	16 Yes	* *	12 No	11 No	* *	* *	11 No	10 No
	98 th percentile 24-hr concentration	37	46	46	38	39	31	*	36	27	24

* There was insufficient (or no) data available to determine the value.
SOURCE: CARB, Air Quality Data Statistics, available at <http://www.arb.ca.gov/adam>, accessed January 26, 2011.

Figure 6-5: NORMALIZED MONITORED PM CONCENTRATIONS

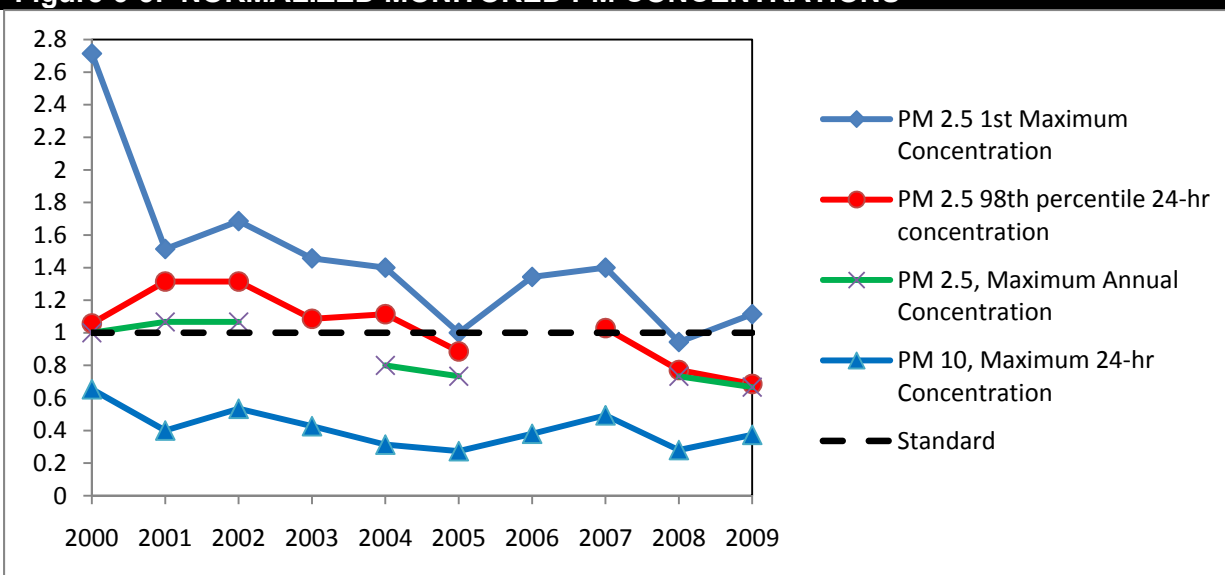


Table 6-8, which was derived from Chapter 10 (Looking beyond Current Requirements) of the 2007 AQMP, provides a comparison of the monitored 2005 PM levels to the model predicted values for 2015 and 2021. As shown, the projected data indicate a trend of decreasing ambient PM concentrations from 2005 to 2021. The monitored PM ambient concentrations at the Mission Viejo Monitoring Station, shown in **Table 6-7**, support the modeled predicted trends, as the recorded PM_{10} and $\text{PM}_{2.5}$ levels at the monitoring station between the years 1999 and 2006 for both the 24-hour levels and average annual values show a general declining trend.

**TABLE 6-8: COMPARISON OF PARTICULATE MATTER AMBIENT CONCENTRATIONS
(SOUTH COAST AIR BASIN)**

Pollutant (Averaging Time)	Standard ($\mu\text{g}/\text{m}^3$)	2005		2015 /a/		2021	
		Observed Max Value ($\mu\text{g}/\text{m}^3$)	% Above Standard	Projected Max Value ($\mu\text{g}/\text{m}^3$)	% Above Standard	Projected Max Value ($\mu\text{g}/\text{m}^3$)	% Above Standard
PM ₁₀ (24-hour)	150	131	Met	117	Met	111	Met
PM _{2.5} (Annual)	15	21	40	15	Met	<15	Met
PM _{2.5} (24-hour)	35	133	279	57	63	52	49

/a/ Projected data include the 2007 Control Strategies.

SOURCE: SCAQMD, 2007 AQMP, Chapter 10.

e) Traffic Condition Effects

The proposed project would relieve congestion by widening I-405, braiding and reconstructing interchanges, and achieving the following safety improvements within the project limits by reducing:

- congestion-related collisions on the mainline of I-405
- collisions within interchanges by adding braided ramps to eliminate traffic weaving maneuvers
- off-ramp queuing onto the freeway mainline
- on-ramp queuing onto arterials due to mainline congestion and ramp meter operation.

The proposed project would relieve congestion and improve operational efficiency on I-405 between SR-73 and SR-605. In addition, the project includes reconfiguration of freeway interchanges within the project limits and arterial street intersections; therefore, the project would improve traffic operations along the project corridor and freeway ramps and interchanges, as well as intersections within the study area. The effects of the Build Alternatives on the freeway and intersections are discussed below.

The project corridor has insufficient capacity to accommodate existing and projected travel demands between the SR-73 interchange and I-605. The current deficiencies within the project limits are summarized below:

- The I-405 mainline GP lanes peak period traffic demand exceeds available capacity;
- The I-405 mainline HOV lanes peak period traffic demand exceeds available capacity;
- The I-405 mainline GP traffic lanes have operational and geometric deficiencies; and
- The interchanges along I-405 within the study area have geometric, storage, and operational capacity deficiencies.

As discussed in the transportation analysis, the build alternatives would increase freeway capacity to address the existing deficiencies. As a result, freeway mainline and interchange operating conditions will improve. It is important to note that vehicle speeds will improve on both the mainline and in the HOV lanes. Peak-hour congestion will be reduced leading to a reduction in vehicle idling and associated emissions.

The transportation analysis assessed over 75 intersections in the project area. The analysis indicated that none of the intersections operating at a poor level of service (i.e., D, E, or F) without the project would be further congested with the proposed improvements. To the contrary, the proposed project reduces queuing onto arterials due to mainline congestion and

ramp meter operation and decreases arterial congestion. Refer to the transportation analysis for a detailed discussion of intersection operating improvements.

An increase of PM emissions would occur if the project significantly increased ADT in the project area and at locations where there are more traffic delays. Traffic delays would occur at freeway segments and intersections where vehicles are accumulating and idling. It is unlikely that PM hot spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. Potential localized PM increases associated with the increase in ADT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the project is not expected to cause an adverse affect with respect to localized concentrations of PM_{2.5} or PM₁₀, at any nearby sensitive receptor.

Emissions Calculation

Tables 6-2 through 6-4 present emissions, including PM₁₀ and PM_{2.5}, from vehicles traveling along the project corridor for the years 2009, 2020, and 2040. Estimates of PM₁₀ and PM_{2.5} emissions for base, opening, and horizon years show that project implementation would not generate significant additional daily emissions. Because the VMT and the number of trucks (not percentage) are predicted to increase with time, the paved road dust emissions would also increase with time. This finding is consistent with the emission inventories reported in the SCAQMD 2007 AQMP, which also shows an increase of road dust emissions with time. Because paved road emissions are included in the 2007 AQMP and the PM_{2.5} SIP, paved road emissions have been accounted for as part of the PM_{2.5} attainment plan; therefore, the proposed project is not expected to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the NAAQS.

In conclusion, the proposed project would improve the operations of the I-405 freeway and studied intersections and increase vehicle speeds in the project area, compared to the No Build scenario. Accordingly, it is reasonable to conclude that PM emissions associated with the proposed action would not generate high concentrations of PM (hot spots); therefore, the project meets the project-level conformity requirements for PM₁₀ and PM_{2.5} as defined in 40 CFR Sections 93.116 and 93.123.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to particulate matter emissions.

6.6 AIR QUALITY CONFORMITY ANALYSIS

Transportation conformity is an analysis required under CAA section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Regional conformity for a given project is analyzed by discussing if the proposed project is included in a conforming Regional Transportation Plan or Transportation Improvement Plan with substantially the same design concept and scope that was used for the regional conformity analysis. Project level conformity is analyzed by discussing if the proposed project would cause localized exceedances of CO, PM_{2.5}, and/or PM₁₀ standards, or it would

interfere with “timely implementation” of Transportation Control Measures called out in the State Implementation Plan.

6.6.1 Regional Conformity

Alternative 1 is fully funded and is in the 2008 Regional Transportation Plan which was found to conform by the Southern California Association of Governments on May 8, 2008, and FHWA and FTA adopted the air quality conformity finding on June 5, 2008. The project is described as, “construct one additional all purpose lane in each direction on I-405 and provide additional capital improvements from SR 73 through the LA County Line” (RTP and RTIP ID ORA030605). The project is also included in the Southern California Association of Governments financially constrained 2008 Regional Transportation Improvement Program. The Southern California Association of Governments Regional Transportation Improvement Program was found to conform by FHWA and FTA on July 17, 2008. The design concept and scope of the proposed project is consistent with the project description in the 2008 RTP, the 2008 RTIP and the assumptions in the Southern California Association of Governments regional emissions analysis.

The design concept of Alternative 2 includes an additional general purpose lane beyond the Alternative 1 design concept that was included in the 2008 RTP. The design concept of Alternative 3 includes an additional general purpose lane and express facility beyond the Alternative 1 design concept that was included in the 2008 RTP. **Tables 6-3 and 6-4** show that Alternative 2 and 3 future emissions (2020 and 2040) would be less than baseline emissions, and would be similar to Alternative 1 emissions (no greater than four percent). The design concept and scope of Alternative 2 and 3 are consistent with the project description in the 2008 RTP, the 2008 RTIP and the assumptions in the Southern California Association of Governments regional emissions analysis.

6.6.2 Project Conformity

The project is a project of concern for PM₁₀ and/or PM_{2.5} hot spot analysis based on 40 CFR 93.116 and 93.123, and USEPA’s hot spot guidance. Interagency Consultation concurred with this determination on January 25, 2011. The detailed PM hot spot analysis presented above, consistent with 40 CFR 93.116 and 93.123 and USEPA’s hot spot guidance, shows that the project would not cause or contribute to, or worsen, any new localized violation of PM₁₀ and/or PM_{2.5} standards.

6.7 MOBILE SOURCE AIR TOXICS (MSAT) ANALYSIS

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

Controlling air toxic emissions became a national priority with the passage of the CAAA of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). In addition, USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment.

These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While the Federal Highway Administration (FHWA) considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future USEPA rules.

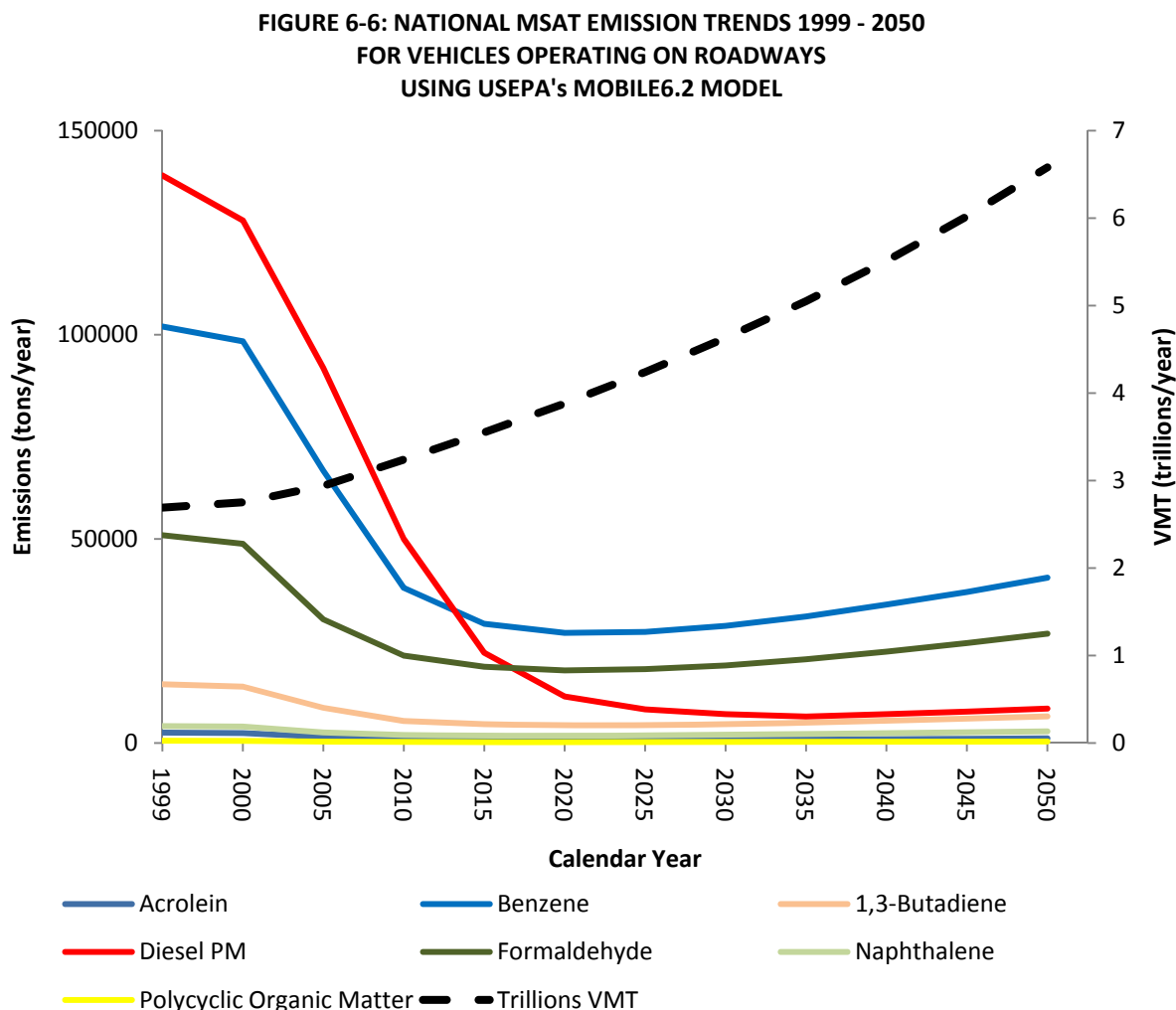
The 2007 USEPA rule mentioned above requires controls that will dramatically decrease mobile source air toxics (MSAT) emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using USEPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in **Figure 6-6**.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, USEPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Incomplete or Unavailable Information for Project Specific MSAT Impacts Analysis. In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects". Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.



Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results

produced by the USEPA's MOBILE6.2 model, the CARB's EMFAC2007 model, and the USEPA's Draft MOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of USEPA's guideline CAL3QHC model was conducted in an NCHRP study, which documents poor model performance at ten sites across the country – three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI. As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel particulate matter. The USEPA and the HEI have not established a basis for quantitative risk assessment of diesel particulate matter in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Relevance Of Unavailable Or Incomplete Information To Evaluating Reasonably Foreseeable Significant Adverse Impacts On The Environment, And Evaluation Of Impacts Based Upon Theoretical Approaches Or Research Methods Generally Accepted In The Scientific Community. Because of the uncertainties outlined above, a reliable quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

MSAT Emissions in the Project Area. The FHWA, in its Interim Guidance published on September 30, 2009 (*Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*) recommends a range of options deemed appropriate for addressing and documenting the MSAT issue in NEPA documents. Based on the FHWA guidance, the proposed project has the potential for meaningful differences in MSAT emissions among project alternatives. Therefore, level of emissions for the highest priority MSATs for the No Build and build alternatives was evaluated (Level 3 Analysis).

The basic procedure for analyzing emissions for on-road MSAT is to calculate emission factors using EMFAC2007 and apply the emission factors to speed and VMT data specific to the proposed project. EMFAC2007 is the emission inventory model developed by the CARB, which calculates emission inventories for motor vehicles operating on roads in California. The emission factors used in this analysis is from EMFAC2007 and is specific to the Orange County portion of the Basin. Results were produced for the base year (2009), the first operational year once the proposed project is complete (2020), and the horizon year (2040). 2020 and 2040 analyses compared the No Build Alternative to the build alternatives resulting from implementation of the proposed project.

Alternative 1 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (**Tables 6-9** and **6-10**, respectively). The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 1 emissions will likely be lower than present levels in the design year as a result of USEPA's and California's control programs that are projected to further reduce MSAT emissions.

TABLE 6-9: MSAT EMISSIONS - 2020

Toxic Air Contaminant	Existing Emissions (grams/day)	2020 No Build Emissions (grams/day)	2020 Build		
			Emissions (grams/day)	Existing Percent Change /a/	No Build Percent Change /a/
Alternative 1					
Diesel PM	5,752	5,671	3,891	(32)	(31)
Formaldehyde	7,409	4,977	3,282	(56)	(34)
1,3-Butadiene	1,916	1,125	777.9	(59)	(31)
Benzene	9,379	6,517	4,193	(55)	(36)
Acrolein	439.5	259.2	178.5	(59)	(31)
Acetaldehyde	2,203	1,565	1,017	(54)	(35)
Alternative 2					
Diesel PM	5,752	5,671	3,863	(33)	(32)
Formaldehyde	7,409	4,977	3,370	(55)	(32)
1,3-Butadiene	1,916	1,125	821.4	(57)	(27)
Benzene	9,379	6,517	4,255	(55)	(35)
Acrolein	439.5	259.2	189.0	(57)	(27)
Acetaldehyde	2,203	1,565	1,028	(53)	(34)
Alternative 3					
Diesel PM	5,752	5,671	3,957	(31)	(30)
Formaldehyde	7,409	4,977	3,535	(52)	(29)
1,3-Butadiene	1,916	1,125	870.2	(55)	(23)
Benzene	9,379	6,517	4,436	(53)	(32)
Acrolein	439.5	259.2	200.7	(54)	(23)
Acetaldehyde	2,203	1,565	1,072	(51)	(32)
/a/ Percent change is calculated as (B-A)/A. For example, the existing percent change for diesel particulate matter in Alternative 1 is (3,891-5,752)/5,752.					
SOURCE: TAHA, 2011.					

Construction MSAT emissions. Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation will benefit from a number of technologies and operational practices that should help lower short-term MSAT. Construction minimization and avoidance measures includes strategies that reduce engine activity or reduce emissions per unit of operating time, such as reducing the number of trips and the amount of extended idling. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near populated areas. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. Verified emissions control technology retrofits or fleet modernization of engines for construction equipment could be appropriate mitigation strategies. Technology retrofits could include particulate matter traps, oxidation catalysts, and other devices that provide an after treatment of exhaust emissions. Implementing maintenance programs per manufacturers' specifications to ensure engines perform at USEPA certification levels, as applicable, and to ensure retrofit technologies perform at verified standards, as applicable, could also be deemed appropriate. The use of clean fuels, such as ultra-low sulfur diesel, biodiesel, or natural gas also can be a very cost-beneficial strategy. The USEPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions minimization measures for equipment used in construction.

TABLE 6-10: MSAT EMISSIONS - 2040

Toxic Air Contaminant	Existing Emissions (grams/day)	2040 No Build Emissions (grams/day)	2040 Build		
			Emissions (grams/day)	Existing Percent Change /a/	No Build Percent Change /a/
Alternative 1					
Diesel PM	5,752	6,448	4,779	(17)	(26)
Formaldehyde	7,409	6,137	3,325	(55)	(46)
1,3-Butadiene	1,916	1,048	648.4	(66)	(38)
Benzene	9,379	7,579	4,005	(57)	(47)
Acrolein	439.5	233.9	147.0	(67)	(37)
Acetaldehyde	2,203	2,214	1,136	(48)	(49)
Alternative 2					
Diesel PM	5,752	6,448	3,417	(41)	(47)
Formaldehyde	7,409	6,137	2,145	(71)	(65)
1,3-Butadiene	1,916	1,048	446.8	(77)	(57)
Benzene	9,379	7,579	2,538	(73)	(67)
Acrolein	439.5	233.9	100.8	(77)	(57)
Acetaldehyde	2,203	2,214	716.1	(67)	(68)
Alternative 3					
Diesel PM	5,752	6,448	3,402	(41)	(47)
Formaldehyde	7,409	6,137	2,108	(72)	(66)
1,3-Butadiene	1,916	1,048	453.2	(76)	(57)
Benzene	9,379	7,579	2,495	(73)	(67)
Acrolein	439.5	233.9	102.2	(77)	(56)
Acetaldehyde	2,203	2,214	694.4	(68)	(69)
/a/ Percent change is calculated as (B-A)/A. For example, the existing percent change for diesel particulate matter in Alternative 1 is (4,779-5,752)/5,752.					
SOURCE: TAHA, 2011.					

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (**Tables 6-9** and **6-10**, respectively). The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 2 emissions will likely be lower than present levels in the design year as a result of USEPA's and California's control programs that are projected to further reduce MSAT emissions. In addition, similar to Alternative 1, Alternative 2 would not result in adverse construction MSAT emissions.

Alternative 3 – Express Facility

Alternative 3 would have lower emissions compared to the No Build Alternative for the years 2020 and 2040 (**Tables 6-9** and **6-10**, respectively). The analysis also shows that MSAT emissions in 2020 and 2040 would be less than the existing (2009) conditions. Alternative 3 emissions will likely be lower than present levels in the design year as a result of USEPA's and California's control programs that are projected to further reduce MSAT emissions. In addition, similar to Alternative 1, Alternative 2 would not result in adverse construction MSAT emissions.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to mobile source air toxics.

6.8 DIESEL PARTICULATE MATTER EXHAUST

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

In 1998, California identified diesel exhaust particulate matter (PM) as a toxic air contaminant based on its potential to cause cancer, premature death, and other health problems. This assessment formed the basis for a decision by the CARB to formally identify particles in diesel exhaust as a toxic air contaminant that may pose a threat to human health.

Diesel engines emit a complex mix of pollutants, the most visible of which are very small carbon particles or "soot", known as diesel particulate matter. Diesel exhaust also contains over 40 cancer-causing substances, most of which are readily adsorbed on the soot particles. These include many known or suspected cancer-causing substances, such as benzene, arsenic, and formaldehyde.

Overall, diesel engine emissions are responsible for a majority of California's estimated cancer risk attributable to air pollution. In addition, diesel particulate matter is a significant fraction of California's particulate pollution problem. Assessments by CARB and USEPA estimate that diesel particulate matter annually contributes to approximately 3,500 premature respiratory and cardiovascular deaths and thousands of hospital admissions, asthma attacks and other respiratory symptoms.

The CARB has found that diesel particulate matter contributes over 70 percent of the known risk from air toxics and poses the greatest cancer risks among all identified air toxics. Diesel trucks contribute more than half of the total diesel combustion sources. However, the CARB has adopted a Diesel Risk Reduction Plan (DRRP) with control measures that would reduce the overall diesel particulate matter emissions by about 85 percent from 2000 to 2020. In addition, total toxic risk from diesel exhaust may only be exposed for a much shorter duration. Further, diesel particulate matter is only one of many environmental toxics and those of other toxics and other pollutants in various environmental media may overshadow its cancer risks. Thus, while diesel exhaust may pose potential cancer risks to receptors spending time on or near high risk diesel particulate matter facilities, most receptors' short term exposure would only cause minimal harm, and these risks would also greatly diminish in the future operating years of the proposed project due to planned emission control regulations. Alternative 1 would not result in an adverse impact related to diesel particulate matter emissions.

Alternative 2 – Add Two GP Lanes in Each Direction

A daily increase in diesel particulate matter emissions would result from additional trucks in the fleet mix or lower vehicle speeds. Alternative 2 would not increase the percentage of trucks in the fleet mix and would improve vehicle speeds in the project area. As a result, Alternative 2 diesel particulate matter emissions would likely be less than Baseline emissions. Therefore, Alternative 2 would not have an adverse operational diesel particulate matter impact.

Alternative 3 – Express Facility

A daily increase in diesel particulate matter emissions would result from additional trucks in the fleet mix or lower vehicle speeds. Alternative 3 would not increase the percentage of trucks in the fleet mix and would improve vehicle speeds in the project area. As a result, Alternative 3 diesel particulate matter emissions would likely be less than Baseline emissions. Therefore, Alternative 3 would not have an adverse operational diesel particulate matter impact.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to diesel particulate matter emissions.

6.9 NATURALLY OCCURRING AND STRUCTURAL ASBESTOS

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, federal, and international agencies and was identified as a toxic air contaminant by the CARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have commonly been used for unpaved gravel roads, landscaping, fill projects and other improvement projects in some localities. Asbestos may be released into the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. Serpentinite may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in the counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology have developed a map of the state showing the general location of ultramafic rock in the state.⁶ Orange County has not been identified as containing serpentinite and ultramafic rock.

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

The California Division of Mines and Geology (CDMG) Geological Map Index was searched for available geological maps, which cover the project study area and surrounding areas. These geological maps indicate geological formations, which are overlaid on a topographic map. Some maps focus on specific issues (i.e., bedrock, sedimentary rocks, etc.), while others may identify artificial fills (including landfills). Geological maps can be effective in estimating

⁶ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf

permeability and other factors that influence the spread of contamination. According to *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (August 2000), the project corridor is not located in a known or suspected asbestos area.

Naturally Occurring Asbestos (NOA) in bedrock is typically associated with serpentine and peridotite deposits. Therefore, the potential for NOA to be present within the project limits is considered to be low. Furthermore, prior to the commencement of construction, qualified geologists would further examine the soils and makeup of the existing structure. Should the project geologist encounter asbestos during the analysis, proper steps shall be executed to handle the materials. Note that during demolition activities, the likelihood of encountering structural asbestos is low due to the nature of the demolished materials. The material would consist of concrete and metal piping. Therefore, Alternative 1 would not result in an adverse impact related to asbestos.

Alternative 2 – Add Two GP Lanes in Each Direction

Alternative 2 would occur in the same location as Alternative 1. The project corridor is not located in a known or suspected asbestos area and the likelihood of encountering structural asbestos is low due to the nature of the demolished materials. Therefore, Alternative 2 would not result in an adverse impact related to asbestos.

Alternative 3 – Express Facility

Alternative 3 would occur in the same location as Alternative 1. The project corridor is not located in a known or suspected asbestos area and the likelihood of encountering structural asbestos is low due to the nature of the demolished materials. Therefore, Alternative 3 would not result in an adverse impact related to asbestos.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. Therefore, the No Build Alternative would not result in an adverse impact related to asbestos.

6.10 GLOBAL CLIMATE CHANGE

NEPA Impacts

Neither USEPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level GHG analysis. As stated on FHWA's climate change website (<http://www.fhwa.dot.gov/hep/climate/index.htm>), climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in the CEQA analysis and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours travelled.

CEQA Impacts

Alternative 1 – Add One General Purpose (GP) Lane in Each Direction

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF₆), HFC-23 (fluoroform), HFC-134a (s, s, s, 2 – tetrafluoroethane), and HFC-152a (difluoroethane).

In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the State level. Assembly Bill 1493 requires the CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 model year; however, in order to enact the standards California needed a waiver from the USEPA. The waiver was denied by the USEPA in December 2007 and efforts to overturn the decision had been unsuccessful. See *California v. Environmental Protection Agency*, 9th Cir. Jul. 25, 2008, No. 08-70011. However, on January 26, 2009, it was announced that the USEPA would reconsider their decision regarding the denial of California's waiver. On May 18, 2009, President Obama announced the enactment of a 35.5 miles per gallon fuel economy standard for automobiles and light duty trucks which will take effect in 2012. On June 30, 2009 the USEPA granted California the waiver. California is expected to enforce its standards for 2009 to 2011 and then look to the federal government to implement equivalent standards for 2012 to 2016. The granting of the waiver will also allow California to implement even stronger standards in the future. The State is expected to start developing new standards for the post-2016 model years later this year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs State agencies to begin implementing AB 32, including the recommendations made by the State's Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least ten percent by 2020.

Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the USEPA to regulate GHG as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., 549 U.S. 497 (2007)). The court ruled that GHG does fit within the Clean Air Act's definition of a pollutant, and that the USEPA does have the authority to regulate GHG.

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHG under section 202(a) of the CAA:

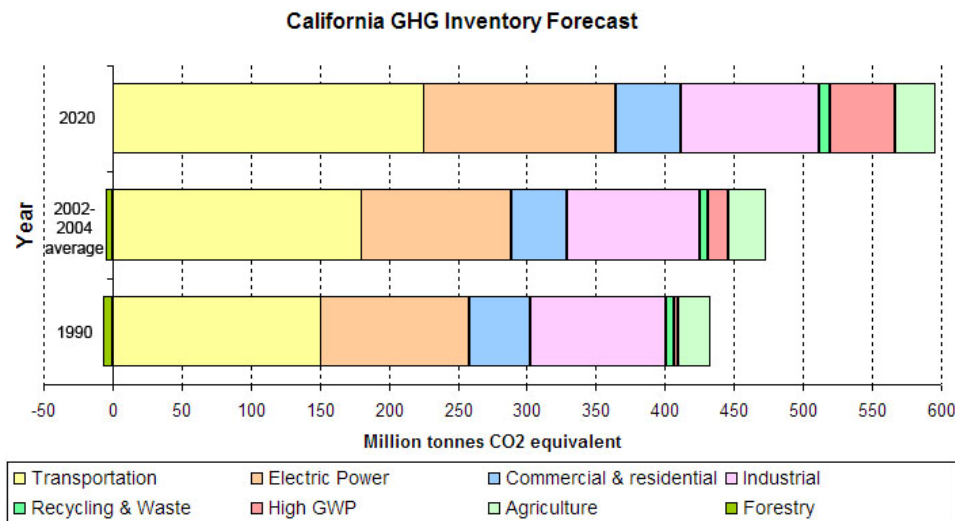
- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs -- CO₂, CH₄, N₂O, Hydrofluorocarbons, Perfluorocarbons, and SF₆ -- in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the USEPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by the USEPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009.⁷

According to *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), an individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(i)(1) and 15130. To make this determination the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects in order to make this determination is a difficult if not impossible task.

As part of its supporting documentation for the Draft Scoping Plan, CARB recently released an updated version of the GHG inventory for California (June 26, 2008). Shown below is a graph from that update that shows the total GHG emissions for California for 1990, 2002-2004 average, and 2020 projected if no action is taken.

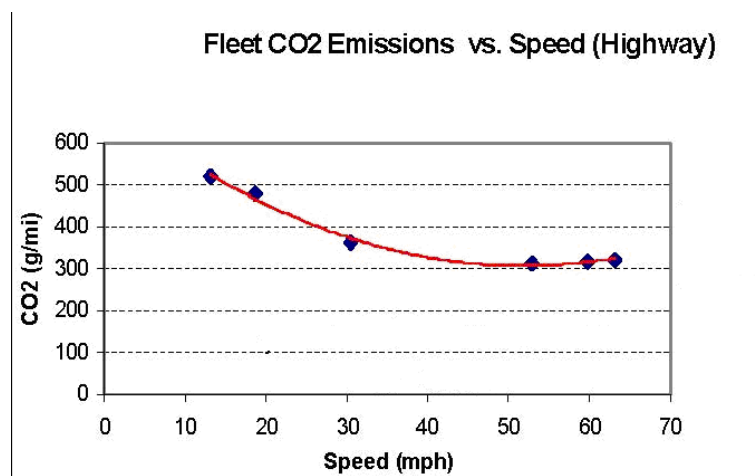
⁷<http://www.epa.gov/climatechange/endangerment.html>



Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation (see Climate Action Program at Caltrans (December 2006), Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006. This document can be found at: <http://www.dot.ca.gov/docs/ClimateReport.pdf>.

Project Analysis

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. As shown below, the highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0 to 25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from 0 to 25 miles per hour. To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors GHG emissions, particularly CO₂, may be reduced. The purpose of the proposed project is to relieve congestion and improve operational efficiency on I-405 between SR-73 and I-605.



Existing GHG emissions are presented in **Table 3-14** and future GHG emissions are presented in **Tables 6-11** and **6-13**. Future GHG emissions (2020 and 2040) would be greater than existing emissions. Unlike criteria pollutants, EMFAC2007 indicates that technological changes in automobile engines will not result in less GHG emissions in the future. However, automobiles will generate fewer GHG emissions under higher speeds. Therefore, Alternative 1 would result in fewer GHG emissions than the No Build Alternative in 2020 and 2040.

TABLE 6-11: ESTIMATED EXISTING ANNUAL GREENHOUSE GAS EMISSIONS	
Source	Carbon Dioxide Equivalent (Metric Tons per Year)
Existing Conditions	1,864
SOURCE: TAHA, 2011.	

TABLE 6-12: ESTIMATED 2020 ANNUAL GREENHOUSE GAS EMISSIONS	
Source	Carbon Dioxide Equivalent (Metric Tons per Day)
No Build	3,134
Alternative 1	2,568
Net Change from No Build to Alternative 1	(566)
Alternative 2	2,586
Net Change from No Build to Alternative 2	(548)
Alternative 3	2,589
Net Change from No Build to Alternative 3	(545)
SOURCE: TAHA, 2011.	

TABLE 6-13: ESTIMATED 2040 ANNUAL GREENHOUSE GAS EMISSIONS	
Source	Carbon Dioxide Equivalent (Metric Tons per Day)
No Build	5,013
Alternative 1	3,829
Net Change from No Build to Alternative 1	(1,184)
Alternative 2	3,234
Net Change from No Build to Alternative 2	(1,779)
Alternative 3	3,310
Net Change from No Build to Alternative 3	(1,703)
SOURCE: TAHA, 2011.	

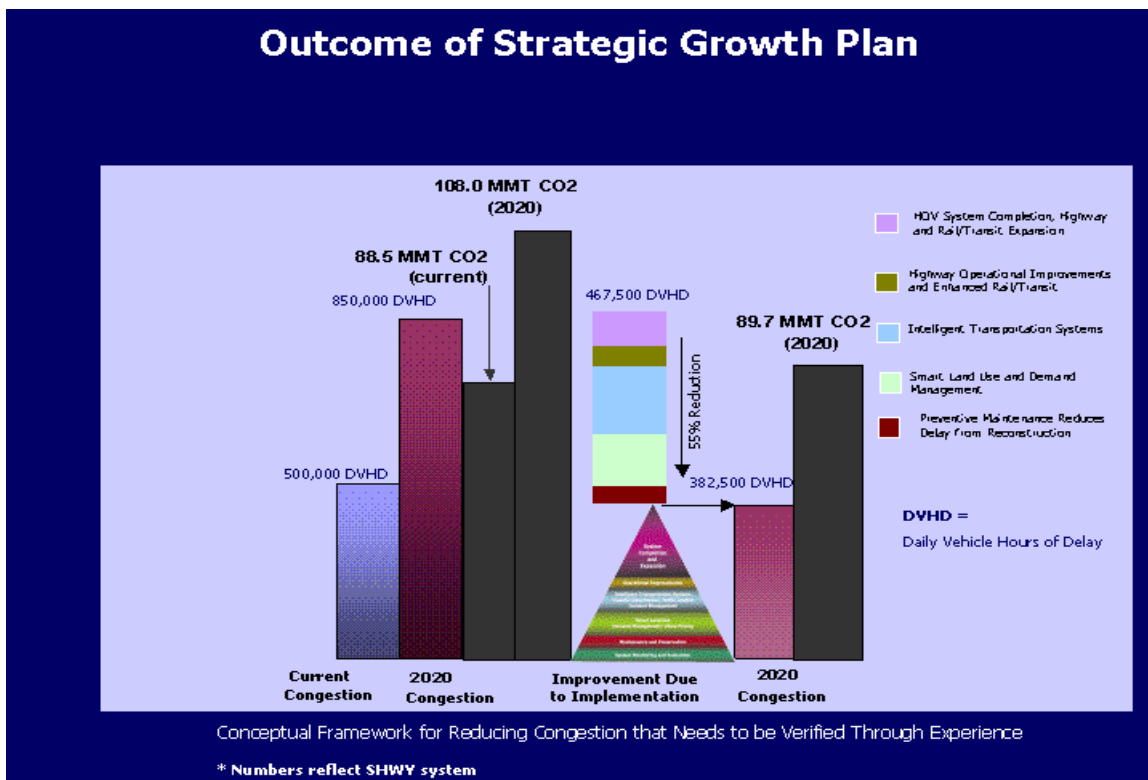
The GHG estimations are not necessarily an accurate reflection of what the true CO₂ emissions will be because CO₂ emissions are dependent on other factors that are not part of the EMFAC2007 methodology such as the fuel mix (EMFAC model emission rates are only for direct engine-out CO₂ emissions not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components), rate of acceleration, and the aerodynamics and efficiency of the vehicles.

Construction Emissions

Construction GHG emissions include emissions produced as a result of material processing, emissions produced by on-site construction equipment, and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction will be lessened to some degree by longer intervals between maintenance and rehabilitation events. Construction activity would generate approximately 4,830 metric tons per year of GHG emissions.

AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement the Governor's Executive Orders and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a \$222 billion infrastructure improvement program to fortify the State's transportation system, education, housing, and waterways, including \$100.7 billion in transportation funding during the next decade. As shown below, the Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together yield the promised reduction in congestion. The Strategic Growth Plan relies on a complete systems approach of a variety of strategies: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements.



As part of the Climate Action Program at Caltrans, Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by USEPA and CARB. Lastly, the use of alternative fuels is also being considered; the Department is participating in funding for alternative fuel research at the University of California at Davis.

Table 6-14 summarizes the Department and Statewide efforts that Caltrans is implementing in order to reduce GHG emissions. For more detailed information about each strategy, please see Climate Action Program at Caltrans (December 2006).

The following measures will reduce the GHG emissions and potential climate change impacts from the proposed project:

1. Caltrans and the California Highway Patrol are working with regional agencies to implement intelligent transportation systems (ITS) to help manage the efficiency of the existing highway system. ITS is commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

TABLE 6-14: CLIMATE CHANGE STRATEGIES						
Strategy	Program	Partnership		Method/Process	Estimated CO2 Savings (MMT)	
		Lead	Agency		2010	2010
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.007	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.67
SOURCE: Caltrans, 2011						

- Southern California Association of Governments provides ridesharing services and park-and-ride facilities to help manage the growth in demand for highway capacity.
- According to Caltrans Standard Specification Provisions, idling time for lane closure during construction is restricted to ten minutes in each direction.

4. The construction contractor must comply with SCAQMD rules, ordinances, and regulations in regards to air quality restrictions.

Adaptation Strategies

Adaptation Strategies refer to how Caltrans and others can plan for the effects of climate change on the State's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damaging roadbeds by longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

Climate change adaption must also involve the natural environment as well. Efforts are underway on a Statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, Governor Schwarzenegger signed Executive Order S-13-08 which directed a number of State agencies to address California's vulnerability to sea level rise caused by climate change.

The California Resources Agency [now the Natural Resources Agency, (Resources Agency)], through the interagency Climate Action Team, was directed to coordinate with local, regional, State and federal public and private entities to develop a State Climate Adaptation Strategy. The Climate Adaptation Strategy will summarize the best known science on climate change impacts to California, assess California's vulnerability to the identified impacts and then outline solutions that can be implemented within and across State agencies to promote resiliency.

As part of its development of the Climate Adaptation Strategy, Resources Agency was directed to request the National Academy of Science to prepare a Sea Level Rise Assessment Report by December 2010 to advise how California should plan for future sea level rise. The report is to include:

- relative sea level rise projections for California, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates
- the range of uncertainty in selected sea level rise projections
- a synthesis of existing information on projected sea level rise impacts to State infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems
- a discussion of future research needs regarding sea level rise for California

Furthermore Executive Order S-13-08 directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level affecting safety, maintenance and operational improvements of the system and economy of the State. The Department continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Prior to the release of the final *Sea Level Rise Assessment Report*, all State agencies that are planning to construct projects in areas vulnerable to future sea level rise were directed to consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. However, all projects that have filed a Notice of Preparation, and/or are programmed for construction funding from 2008 through 2013, or are routine maintenance projects as of the date of Executive Order S-13-08 may, but are not required to, consider these planning guidelines. Sea level rise estimates should also be used in conjunction with information regarding local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data. (Executive Order S-13-08 allows some exceptions to this planning requirement.) The proposed project is programmed for construction funding beginning in 2015 and is not a routine maintenance project. Therefore, the proposed project is required to consider sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted as part of Governor's Schwarzenegger's Executive Order on Sea Level Rise and is mobilizing to be able to respond to the National Academy of Science report on Sea Level Rise Assessment which is due to be released by December 2010.

On August 3, 2009, Natural Resources Agency in cooperation and partnership with multiple State agencies, released the 2009 California Climate Adaptation Strategy Discussion Draft, which summarizes the best known science on climate change impacts in seven specific sectors and provides recommendations on how to manage against those threats. The release of the draft document set in motion a 45-day public comment period. Led by the California Natural Resources Agency, numerous other State agencies were involved in the creation of a discussion draft, including Environmental Protection; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The discussion draft focuses on sectors that include: Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management; Agriculture; Forestry; and Transportation and Energy Infrastructure. The strategy is in direct response to Governor Schwarzenegger's November 2008 Executive Order S-13-08 that specifically asked the Natural Resources Agency to identify how State agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. As data continues to be developed and collected, the State's adaptation strategy will be updated to reflect current findings.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects. However, without Statewide planning scenarios for relative sea level rise and other climate change impacts, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once Statewide planning scenarios become available, the Caltrans will be able review its current design standards to determine what changes, if any, may be warranted in order to protect the transportation system from sea level rise.

As previously discussed, the proposed project is programmed for construction funding beginning in 2015 and is not a routine maintenance project. This analysis is required to discuss the effects of climate change on the project area and facility, such as increased erosion due to storms or flooding, inundation due to higher sea levels, long periods of intense heat, and other factors that may affect the facility during the life of the proposed project. The project corridor is

generally located three-to-four miles from the coast. There is no potential for inundation due to higher sea levels. Roadway damage caused by increased flooding or long periods of intense heat will be managed through facility design features.

Alternative 2 – Add Two GP Lanes in Each Direction

Existing GHG emissions are presented in **Table 6-11** and future GHG emissions are presented in **Tables 6-12** and **6-13** above. Future GHG emissions (2020 and 2040) would be greater than existing emissions. Unlike criteria pollutants, EMFAC2007 indicates that technological changes in automobile engines will not result in less GHG emissions in the future. However, automobiles will generate fewer GHG emissions under higher speeds. Therefore, Alternative 2 would result in fewer GHG emissions than the No Build Alternative in 2020 and 2040.

Alternative 3 – Express Facility

Existing GHG emissions are presented in **Table 6-11** and future GHG emissions are presented in **Tables 6-12** and **6-13** above. Future GHG emissions (2020 and 2040) would be greater than existing emissions. Unlike criteria pollutants, EMFAC2007 indicates that technological changes in automobile engines will not result in less GHG emissions in the future. However, automobiles will generate fewer GHG emissions under higher speeds. Therefore, Alternative 3 would result in fewer GHG emissions than the No Build Alternative in 2020 and 2040.

No Build (No Action) Alternative

The Project Baseline conditions under the No Build Alternative would provide no additional lanes or interchange improvements to the I-405 corridor. As a result, there would be no impacts to global climate change.

6.11 CUMULATIVE IMPACTS RELATED TO AIR QUALITY

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from vehicular traffic that can travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for a project's air quality analysis must be regional by nature.

Construction and operation of cumulative projects would further degrade the local air quality, as well as the air quality of the Basin. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. However, the greatest cumulative impact on the quality of regional air would be the incremental addition of pollutants from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. It should be noted that the proposed project is a transportation improvement, and not a direct trip generator.

With respect to emissions that may contribute to exceeding State and federal standards, a CO and particulate matter screening analysis was performed. The results of this analysis illustrate that localized levels would not exceed published air quality standards, and therefore does not present a significant cumulative impact. Implementation of the proposed project would improve traffic flow and congestion within the project limits of the I-405. Furthermore, although a VMT

increase would occur within the HOV lanes, the general purpose lanes would see an increase in vehicle speeds and associated decrease in emissions. Therefore, the proposed project would not result in an adverse cumulative impact.

7.0 MITIGATION MEASURES

7.1 CONSTRUCTION IMPACTS

Construction impacts would not be adverse and no mitigation measures are required. However, the following standard Caltrans construction emission minimization measures shall be used to control emissions:

AQ1 The construction contractor shall comply with Caltrans' Standard Specifications Section 7-1.01F and Section 10 of Caltrans' Standard Specifications (1999).

- Section 7, "Legal Relations and Responsibility," addresses the contractor's responsibility on many items of concern, such as: air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; and convenience of the public; and damage or injury to any person or property as a result of any construction operation. Section 7-1.01F specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
- Section 10 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.

AQ2 The construction contractor shall apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions.

AQ3 The construction contractor shall spread soil binder on any unpaved roads used for construction purposes, and all project construction parking areas.

AQ4 The construction contractor shall wash off trucks as they leave the right-of-way as necessary to control fugitive dust emissions.

AQ5 The construction contractor shall properly tune and maintain construction equipment and vehicles.

AQ6 The construction contractor shall use low-sulfur fuel in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.

AQ7 The construction contractor shall develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.

AQ8 The construction contractor shall locate equipment and materials storage sites as far away from residential and park uses as practical. Construction areas shall be kept clean and orderly.

AQ9 The construction contractor shall establish environmentally sensitive areas for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited, to the extent that is feasible.